



Biotechnology

White biotechnology is the fastest growing biotech segment

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THE NEWSPAPER
FOR THE CHEMICAL AND
LIFE SCIENCES MARKETS

Logistics

Improving the supply chain in the chemical industry

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Newsflow

Three chemical companies have been listed on the "100 Best Corporate Citizens" for 2008 by Corporate Responsibility Officer Magazine (CRO). Dow Chemicals ranked number 13; Eastman ranked number 64; and Monsanto ranked 88. In compiling the 100 Best – which is in its ninth year of publication – CRO ranked the corporate responsibility efforts of large-cap companies from the Russell 1000 index in eight categories: climate change, employee relations, environment, financial, governance, human rights, lobbying and philanthropy.

► www.thecro.com
► www.dow.com
► www.eastman.com, www.monsanto.com

BASF SE has published its Report 2007, which for the first time combines the company's financial and sustainability reporting in a single publication, making it the first company to do so. The Global Reporting Initiative (GRI), an independent organization that has developed global guidelines to ensure transparent sustainability reporting, has already confirmed that the new report meets its highest application level, A+.

► www.basf.com

BASF and Ineos Nitriles have reached an agreement for Ineos Nitriles to buy the Seal Sands site of BASF plc on Teesside in the UK. The parties agreed not to disclose the acquisition price. All BASF plc personnel will be transferred to Ineos Nitriles, who will also take over existing contracts, supply and service arrangements.

► www.basf.com
► www.ineosnitriles.com

Rhodia will close its paracetamol factory in Roussillon, France, at the end of the year, Le Figaro reported. The site is the last paracetamol factory in Europe. The paper said products were too expensive for principal customers like Sanofi-Aventis, BMS and GSK in the face of competition from producers in Asia, and in particular China.

► www.rhodia.com

Perfect Match — After Basell's attempts to court both the U.S. chemical company Huntsman and General Electric's GE Plastics business went bust last year, the Netherlands-based producer of polypropylene and advanced polyolefins products wasted no time in finding another object of interest. The company's \$19 billion-purchase of Lyondell was completed in December, creating one of the world's largest polymers, chemicals and fuels companies. Dr. Roy T. Fox spoke to Volker Trautz, CEO of Lyondellbasell, about why the two companies are a match made in heaven.

CHEManager Europe: Mr. Trautz, what was the driving cause for the merger between Basell and Lyondell?

V. Trautz: Basell and Lyondell were an almost perfect fit for one another, being complementary in terms of geographic scope, product lines, technology and even people. In our view of the industry, we believe that increasing our scale and product breadth is important to our long-term success. Today, Lyondellbasell owns a unique space in the chemical arena through the vertical integration of its assets – from refining all the way through to specialized products.

The merger of Basell and Lyondell made us the world's third-largest chemical company, with combined pro forma revenues of more than \$40 billion. We are the global leader in polyolefins, a pioneer in propylene oxide, a producer of advanced fuel products and the owner of one of North America's largest full-conversion refineries.

What are the advantages of vertical integration in comparison to a cooperation? Would a strategic partnership or a joint venture have been possible?

We Go Together

Basell's Purchase of Lyondell Creates New Major Player



Volker Trautz
CEO, Lyondellbasell

That said, joint ventures and partnerships are an excellent approach as well and are in fact a point of emphasis for us. This approach is the optimum structure when each party brings something unique to the table that creates a combination that neither party could have achieved on its own. For instance, in our polyolefins joint ventures around the world, our local partners are able to provide local expertise and access to feedstock, while we bring our polymers technology and global marketing network. These arrangements provide a combination of advantages that wouldn't have been feasible through anything other than a joint venture or partnership.

Is there any overlap within the existing product portfolios and

if so, will you cut products or jobs?

V. Trautz: The merger was really driven by the exceptional fit of the businesses, and there is very little overlap. In the products in which both Lyondell and Basell participated, we gained additional geographic reach rather than being in a position that would force us to evaluate making any type of divestiture.

Of course, we are focused on realizing the additional efficiencies and market opportunities that we can now capture as a single, global entity, but these efficiencies are not primarily based on cutting products or people. Both organizations were efficient in terms of personnel and costs because each had spent the last several years working aggressively to optimize their portfolios. Together, we will be just that much more efficient once we finish identifying and capturing the additional savings opportunities that the merger provides.

Continues Page 4 ►►

Increasingly Challenging

Carbogen Amcis Expects Continued Growth, Announces Investments, Acquisitions

Drug Development — After successful restructuring in 2003, Carbogen Amcis has experienced double-digit budgeted growth over the last five years.

Carbogen Amcis offers integrated services and leading technologies to provide innovative chemistry solutions. The Switzerland-based affiliate of Indian contract manufacturer Dishman expects to earn revenues in excess of \$100 million this year. Brandi Schuster and Dr. Michael Reubold spoke with Carbogen Amcis' CEO Mark Griffiths about the company's growth strategy and the changes that came with the transfer of ownership from Solutia to Dishman in 2006.

CHEManager Europe: Mr. Griffiths, Carbogen and Amcis joined forces when acquired by Solutia in 2000. What were the respective assets both formerly independent Swiss companies added to this partnership?

M. Griffiths: Both organizations came together with early-stage drug development from Carbogen and a background of process development and optimization for commercial-scale manufacture of active pharmaceutical ingredients from Amcis. There were complementary capabilities with a limited amount of overlap. Culturally, the two organizations were born in the same way with two entrepreneurs building up a base of technology and capability. It really was a very good fit from a cultural and technical point of view.

In 2006, India's leading contract manufacturing company Dishman acquired the newly merged Carbogen Amcis from Solutia. What has changed since the ownership went from Solutia to Dishman, two corporations with apparently different cultures?

M. Griffiths: The cultural impact has been very positive. Dishman's culture is very much in



Mark Griffiths
CEO, Carbogen Amcis

service, supply, and support of customers' drug development manufacturing programs. What has changed is that we now have a parent company that understands chemistry and the

drug development pipeline.

Dishman was founded by J. R. Vyas, an entrepreneur, a scientist and a technical person, who saw an opportunity in the market to support customers in life sciences development and manufacture. He was able to convince customers that he had the technical capability and contacts to build a thriving API manufacture in India. The acquisition of Carbogen Amcis gave Dishman the ability to work at an earlier stage of API development. In Switzerland, it gave us the opportunity to have access to high-quality GMP facilities at a multi-ton scale in India

Dishman announced that it wants to leverage its competency in operational efficiency in India to improve margins – also in its

Swiss operations. How has that worked out so far?

M. Griffiths: It has opened up a lot of opportunities for us. Access to the big GMP capacity in India has given us the opportunity to retain projects that we not have gotten in Switzerland otherwise. We are already working on several projects – including development work was carried out in Switzerland and then transferred over to the Bavla site in India for large scale supply; one involves supplying critical GMP intermediates at large scale in India and provided those back to Switzerland for further processing of the final API. We continue to look at projects with our customers, where there is a potential destination to go large-scale. That is where we are gaining additional margin, because we would not otherwise see those projects.

Dishman also acquired a research facility in UK with the ac-

quisition of Synprotec DCR and another research facility in Switzerland through the acquisition of a majority stake in IO3S. How do these assets add to Carbogen Amcis' expertise and service offerings?

M. Griffiths: IO3S has a fully developed laboratory as well as a pilot plant for ozone-based reactions. Their research and development capability provides excellent scale-up opportunities within our manufacturing plants. In Switzerland, we do some ozone analysis and we have access to their expertise. We can also leverage their capability in ozone chemistry to drive sales in India where Dishman invested into a large-scale ozone chemistry plant at the Bavla site.

The acquisition of Synprotec – now Carbogen CGAM Ltd. – in Manchester, England, has given us greater flexibility to accommodate projects and ensure

Continues Page 18 ►►

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www.hiccs2008.eu

REACH

*REACH (Registration, Evaluation, Authorisation and Restriction of Chemicals)

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U.S. Fuel Production: Record-High in 2007



U.S. fuel production reached a record high in 2007 as refinery capacity expanded for the 11th straight year, API data shows. U.S. crude oil production also rose in 2007, the first annual increase since 1991, according to API's year-end Monthly Statistical Report.

The API statistics also showed that U.S. oil demand was flat in 2007, the third straight year of stagnant or lower oil demand in the world's largest oil-consuming nation.

"While much of the increase in crude oil production represents a recovery from 2006's depressed levels, our latest drilling figures show tremendous industry efforts to develop additional supplies from those regions that are open to exploration," said Ron Planting, manager, information and analysis for API.

Given the higher domestic production and flat demand, total oil imports fell 1.9% from year-ago levels, though imports still cover about 65% of U.S. oil demand.

"Despite high oil prices, the industry worked hard to meet the needs of consumers by producing

record amounts of fuel," said API Chief Economist John Felmy. "Consumers appear to be responding to the higher prices at the margin."

The industry worked hard to meet the needs of consumers by producing record amounts of fuel.

Total U.S. petroleum deliveries, a proxy for demand, averaged 20.7 million barrels per day, the same level seen in 2006, following a decline of 0.6% in that year. In the fourth quarter alone, deliveries slumped 0.4%.

Despite a 1% year-on-year increase in the first quarter, gasoline demand was lagging about half a percent below 2006 levels by the fourth quarter. On the other hand, distillate fuel oil demand rose 1.5% in the year amid rising diesel demand and higher home heating demand.

The demand data includes an increase in the amount of ethanol blended into gasoline, which averaged more than 400,000 barrels per day. Excluding ethanol, which accounted for nearly 5% of all gasoline sales during the year, total domestic oil deliveries in 2007 actually fell half a percent. An estimated 6.7 billion gallons of fuel ethanol were used by refiners in 2007, some two billion gallons more than the 4.7 billion gallons required by law but more than two billion gallons less than the recently-passed requirement for 2008.

www.api.org

BASF: Styrenics to Be Completed in H1 2008

BASF said it plans to complete the sale of its commodity styrenics business within the first six months of the year. Chairman Jürgen Hambrecht said at the spring press conference that the group is now negotiating with only one prospective buyer, but he did not mention any names. Thus far, only Lyondellbasell has pub-

licly declared interest. Following a record 2007, when sales rose 10% to nearly €58 billion and EBIT climbed 5% to more than €7.6 billion, Hambrecht is optimistic about the outlook for 2008, despite increasingly gloomy global economic forecasts.

www.basf.com

Huntsman CEO to Lead Board After Hexion Deal Closes



Peter Huntsman
CEO, Huntsman

Hexion Specialty Chemicals has announced the post-merger senior leaders for the company, contingent on the close of its acquisition of Huntsman Corporation. Huntsman president and CEO Peter R. Huntsman will become chairman of the board for the combined company. Huntsman had led the company since 2000 after joining the company in 1987 and serving as president and chief operating officer beginning in 1994.

Other senior leaders of the merged company will include:

- Craig O. Morrison, chairman, CEO and president of Hexion. Morrison will step in as president and CEO of the new company.

www.hexion.com
www.huntsman.com

Lonza: Smaller Acquisitions 'Always Possible'



Stefan Borgas
CEO, Lonza

Lonza does not have any particular acquisition targets in

sights, but sees acquisitions of up to CHF100 million as "always possible," CEO Stefan Borgas said. He added that he would prefer re-investing excess cash in acquisitions rather than returning money to shareholders. Borgas also noted that Lonza

benefited from a lower tax rate of 16.5% in 2007, but he sees this rate reaching 18% this year.

www.lonza.com

Over 40% of EU27 Enterprises Active in Innovation



A recent study done by Eurostat indicates that in the EU27, 42% of enterprises from industry and services reported some form of innovation activity between 2002 and 2004. Among the EU27 Member States the highest proportion of companies with innovation activity in this period was recorded in Germany (65% of enterprises), followed by Austria (53%), Denmark, Ireland and Luxembourg (52% each), Belgium (51%) and Sweden (50%). The lowest rates were observed in

Bulgaria (16%), Latvia (18%), Romania (20%), Hungary and Malta (both 21%).

Innovation co-operation stood at 26% of all innovative enterprises in the EU27 in 2002-2004. The highest levels of innovation co-operation were found in Lithuania (56% of all innovative enterprises), Slovenia (47%) and Finland (44%), and the lowest levels in Italy (13%) and Germany (16%). In the EU27, the most common co-operation partners were suppliers (17% of all innovative enterprises

worked with them) and customers (14%). Suppliers were the most frequent partners in nearly all Member States, with the highest levels found in Lithuania (45%) and the lowest in Germany, Italy and Austria (7% each). Co-operation with customers in innovation activities ranged from 4% in Spain and Cyprus to 41% in Finland. Innovative enterprises in the EU27 worked together much less often with universities and other higher education institutes (9%) or government and public research institutes (6%). Private-public co-operation on innovation was most frequent in Finland, Slovenia, Slovakia, Latvia and Lithuania, while it was least common in Italy, Malta, Romania and Cyprus.

The study, which also covered Norway and Iceland, was conducted on the occasion of the launch of the European Innovation Scoreboard 2006 (EIS). The EIS evaluates and compares the innovation performance of the EU Member States.

http://epp.eurostat.ec.europa.eu



SALES & PROFITS

Ciba Reports Full Year Results 2007 Ciba had announced its sales growth driven by Asia sales for the full year reached CHF 6,523 million, 3% higher in Swiss Francs and 2% higher in local currencies than the previous year (2006: CHF 6,352 million). Asia continued to show strong growth, up 7% in local currencies over 2006, with China again delivering double-digit growth rates. In Europe, where Germany and Eastern Europe showed good growth, overall sales were slightly higher. Central and South America both continued with good growth trends, however Canada was weaker. Brendan Cummins, CEO, said, "We made important progress in 2007, improving our financial performance and implementing the operational agenda."

► www.ciba.com

Solutia's 4Q Loss Triples Solutia, a U.S.-based chemicals producer that is currently trying to exit bankruptcy, has reported that its net loss more than tripled in the fourth quarter, despite a significant increase in sales. In a filing with the Securities and Exchange Commission, the company said it lost \$145 million, or \$1.39 per share, during the period, compared with a loss of \$45 million, or 43 cents per share, during the same period a year earlier. Revenue for the quarter rose to \$961 million from \$697 million. For the full year, the company reported a loss of \$208 million, or \$1.99 per share, compared with a profit of \$2 million, or 2 cents per share, in 2006. Revenue rose to \$3.54 billion from \$2.8 billion.

► www.solutia.com

Bayer 4Q Net Profit Drops Bayer has reported sharply lower fourth-quarter net profit, due to one-time effects in non-operating result and income taxes, but said it aims to improve its operating margin this year. Fourth-quarter net profit fell 78.5% to €67 million from €311 million, clearly failing analyst expectations of €213 million.

The company's fourth-quarter key earnings indicator, adjusted Ebitda, came in at €1.42 billion, up 13%. Analysts had forecast adjusted Ebitda of €1.49 billion. Sales amounted to €8.04 billion from €7.97 billion in the fourth quarter of 2006, below analyst expectations of €8.12 billion. Adjusted for currency effects and portfolio changes, sales grew 6.1%, with all divisions contributing.

► www.bayer.de

Aker Kvaerner: 2007 'Best Year Ever' Norwegian engineering and construction provider Aker Kvaerner said that 2007 was its, "best year ever," reporting a 90% rise in net profit from NOK 625 million in 2006 to NOK 2.5 billion. Full year consolidated revenues of NOK 57 957 million represented an increase of 15% compared to 2006. This increase was due mainly to good markets and high activity in all business areas. Fourth quarter consolidated revenues amounted to NOK 14 876 million, slightly lower compared with NOK 15 304 million for the same period in 2006. The main reason for this reduction was the successful completion of the Ormen Lange and Snøhvit projects in the third quarter 2007.

► www.akerkvaerner.com



COLLABORATION

Ashland: New European Distributor Agreements Ashland Composite Polymers, a business group of Ashland Performance Materials, a division of Ashland, has announced two new distribution agreements in Europe for Derakane epoxy vinyl ester resins. The agreements, which went into effect March 15, are with T&T Metall e Compositi in Italy, and Romar-Voss in the Benelux (Belgium, The Netherlands, Luxemburg) market. The move replaces the current distributor for Derakane resins in those regions.

These agreements extend the existing relationships between Ashland, T&T Metall e Compositi and Romar-Voss, which currently serve composite fabricators in their respective regions as distributors for Ashland's full line of polyester, vinyl ester, acrylic and phenolic resins, premium gelcoats, and low-profile additives.

► www.ashland.com

Syngenta and Dupont Sign Agreement Syngenta and Dupont have signed a global agreement that will provide Dupont business, Pioneer Hi-Bred, access to Syngenta's novel insect control corn event, MIR162. Under the royalty-bearing agreement, Syngenta will grant Pioneer a non-exclusive, global license with stacking rights to MIR162. MIR162 is currently in the regulatory review process in the U.S. and the major corn export markets. It is expected to receive U.S. regulatory approval by the end of the year. MIR162 will protect corn above the ground by delivering control of a broad spectrum of lepidopteran insects including fall army worm, corn ear worm, western bean and black cut worm and sugar cane borer, which are key pests in the U.S., Brazil and Argentina.

► www.syngenta.com

► www.dupont.com

► www.pioneer.com

Celanese, Wison Sign Supply Agreement Celanese, a hybrid chemical company has entered into a long-term supply agreement with Wison to secure availability of carbon monoxide, a critical raw material, to support future expansion at its Nanjing, China, integrated chemical complex. Wison is the current carbon monoxide supplier for the Celanese acetic acid facility at the Nanjing complex. The acetic acid facility began operation in mid-2007 and has a capacity of 600,000 tns. When fully operational, the Celanese Nanjing integrated chemical complex will include production facilities for other acetyl products, acetic anhydride and vinyl acetate monomer, as well as facilities for emulsions, polymer production and compounding. Financial details were not disclosed.

► www.celanese.com

► www.wison.com



Wind Power Is Competitive A recent scenario analysis made by Emerging Energy Research (EER) on behalf of Vestas Wind Systems A/S has concluded that based on the economic and risk analysis of power generation, wind technology can no longer be marginalised in the power mix. Thus, wind power should be supported in its penetration of the conventional power market to ensure a cleaner, more balanced energy supply in the future.

(Photo by Vestas Wind Systems A/S)

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We Go Together

Basell's Purchase of Lyondell Creates New Major Player

Continued Page 1

Where do you see the greatest difficulties in merging both companies?

V. Trautz: In any merger, the successful integration of different cultures plays a significant role in establishing the foundation for the organization's continued growth. The key from a leadership standpoint is to be able to act patiently but swiftly to bring forward the best in both cultures and to help employees see the value in the diversity that we are bringing together.

Before we even finalized the merger, we surveyed employees of both organizations to learn where our approaches were alike and dissimilar. Perhaps most importantly, we also gained an understanding of the two organizations' perceptions of one another. We learned that we are not as different in our approaches and work processes as we may have thought before the survey. Although we've only been working together as one for a couple of months now, we are already learning just how similar we are and how alike we want the end result for our culture to be.

Both Basell and Lyondell managed to build significant industry positions from fairly modest beginnings. We are coming together now with much enthusiasm, as we have accomplished in one move what would have taken years or been virtually impossible to accomplish on our own. Access Industries is committed to establishing Lyondellbasell as a long-term, significant player in the chemicals arena, and the employees of Basell and Lyondell believe we are going

to accomplish great things together.

Lyondellbasell now has a very broad product portfolio. How are your business segments set up?

V. Trautz: Our three divisions – polymers, chemicals and fuels, plus our technology business – each require different skill sets and areas of focus, so it was a natural choice to set them up as separate businesses though all operate from a global perspective. The fuels business is responsible for the supply of raw materials to our other segments, since they are on the front end of our processes and accustomed to working in a global market that prices daily. The chemicals business is experienced in basic and intermediate chemicals, relying heavily on excellence in operations, as do all of our businesses. In polymers, this business necessitates a closer relationship with the customer and requires more emphasis on product formulation.

Finally, it made sense to break out our technology business separately to ensure that we continue to focus on maximizing the value and continuing the success we've had in utilizing and licensing our technology, which is also a driver and catalyst for many of our joint ventures around the world.

Which of your three business segments is developing the strongest? How would you describe the development of the other two?

V. Trautz: I couldn't really characterize one as stronger than another. Each is unique and equally important to the whole. That's why we have organized



the way we have – we don't want to lose ground or overemphasize any one area. To me, it's not about which is strongest; our goal is to get the most value across all of the assets. As I said earlier, each business will per-

form differently at select points in time. We hope that all continue to demonstrate strength in the near term, but we are convinced that the combined entity will allow us to maximize value in a way that neither Basell nor

Lyondell could have done on its own.

What are your growth expectations and strategies for the three business units? Where will your regional focus be?

V. Trautz: Our immediate focus is on getting the most out of what we have – more than \$40 billion in assets and more than 15,000 skilled employees around the world. When we talk about a regional focus, much of the growth in our industry is taking place in the Middle East and Asia. Both legacy companies had ongoing initiatives aimed at those areas with joint ventures in Saudi Arabia, Kazakhstan and China, as well as other growth in Asia.

While we may see the Middle East, Asia and other areas – including Central Europe, the former Soviet Union, and Latin America – as areas of focus for growth, we have to be able to fund that investment and that's where our assets in the more mature markets of North America and Europe come into play. Their contributions allow us to move forward and expand into new areas of the world. While we may not focus on investing in new capacity plans in the mature areas, we are still considering growth in those regions through other mechanisms.

It's a very exciting time to be in our industry. We are seeing economic development in certain areas of the world that outpaces anything we have experienced in the past. As those areas benefit from an increased standard of living, we will see strong growth in demand for our products, which are so fundamental to the many necessities and conveniences of modern life.

Oil prices per barrel have been swinging between \$90-100. What effects does this have on your business? Where do you see this trend going? Where do you see oil prices in the next year?

V. Trautz: The volatility in oil prices and the lack of clarity

in the direction of those swings create a number of difficulties for us. We sit at a point in the value chain where our chemical segment purchases raw materials in a fuels market and sells them into a chemicals market. Maintaining margins during such volatility is never a simple exercise. And that reality supports our belief that it is essential to own a piece of every link of the chain in a vertically integrated organization. If one segment is impacted negatively by market conditions, another may be benefiting from those same conditions.

In general, it's hard to view the rise in oil prices over the last few years as a true negative, because it's been driven by developing economies that also have helped to drive up demand for our products. If we were to see high prices in the future attributable instead to a lack of supply or a crippled global economy, it would be a different story. But regardless of what happens to oil prices in 2008, Lyondellbasell's diversified portfolio will offer more stability than either organization would have had before the merger.

www.lyondellbasell.com

FACTS AND NUMBERS

\$43 billion

in combined annual revenues

\$48

is what Basell paid per share for Lyondell

60

production sites in 19 countries are run by Lyondellbasell

PwC: China to Overtake U.S. Economy by 2025

China could overtake the US in around 2025 to become the world's largest economy and will continue to grow to around 130% of that of the US by 2050, suggests the newly-published PwC report "The World in 2050: Beyond the BRICs." The projections also indicate that India could grow to almost 90% of the size of the U.S. by 2050, while Brazil seems likely to overtake Japan by 2050 to move into

fourth place. Russia, Mexico and Indonesia all have the potential to have economies larger than those of Germany or the UK by the middle of this century. But the fastest mover could be Vietnam, with a potential growth rate of almost 10% per annum in real dollar terms that could push it up to around 70% of the size of the UK economy by 2050.

www.pwc.com



Henkel has reported its Q4 net profit rose 10.9% to €244 million, which exceeded the average forecast of €240.4 million in a Thomson Financial News survey of nine analysts. Quarterly sales declined 0.5% to €3.186 billion – €3.287 billion had been forecast by analysts, in part because it sold businesses including an Italian fragrance company and amid a decline in laundry and home care revenue.

Henkel Q4 Net Profit Up; Plans Job Cuts

Henkel also announced plans for a program the company said will bring in about €150 million in savings per year from 2011. The company said the program is a bid to boost earnings and competitiveness amid a surge in raw material costs.

Chief executive Ulrich Lehner, who will be stepping down in April, said the cutbacks will "ensure the future viability of our company from a position of strength." The program will

cost about €500 million in 2008 and may result in about 3,000 job cuts, affecting all divisions and regions, Henkel said. It said it will release further details of the programme once it has initiated talks with union representatives and employees.

See also commentary, page 5.

www.henkel.com

IMF: India's Economy to Grow Despite Global Uncertainties

India's economy is expected to grow by 8.75% during the 2008 fiscal year despite global uncertainties including a slowdown in the U.S. and higher oil prices worldwide, according to the International Monetary Fund (IMF). The IMF's executive board indi-

cates the potential growth in the Indian economy is attributable to increased domestic productivity and investment. India's favorable outlook, board members say, has attracted record capital inflows which help finance investment. However, these same investments

also present challenges to managing capital market integration, such as sustaining rapid and inclusive growth, fostering job creation, and maintaining macroeconomic and financial stability in the context of large capital inflows. To overcome these chal-

lenges, the IMF says more flexible labor regulations are needed to facilitate job growth, while higher and more effective public spending on education is needed to address the skills gap.

www.imf.org

Glenmark Establishes Romanian Presence

Glenmark Pharmaceuticals announced that it has established a company in Romania, called Glenmark Pharmaceuticals s.r.l. This will be Glenmark's third country operation in Europe for Glenmark's Specialty Pharmaceutical business, following its acquisition of Medicamenta last year. The company said Roma-

nia is a key strategic market for the development of its specialty business in Europe. The company already has a number of its products under registration in this market. With a population of 22 million, Romania is the seventh most populated country in Europe and, with GDP growth of 7%, it is also

one of the fastest-growing pharmaceutical markets in Europe. In Romania, Glenmark said it hopes to achieve net revenues of up to \$50 million within five years, based on its portfolio of branded generic and specialty products.

www.glenmarkpharma.com

Dow Europe to Shutdown Co-PBR Assets in France

Dow Europe said it will shut down its Cobalt-Polybutadiene Rubber (Co-PBR) assets located in Berre L'Etang, France. The plant is located within the Shell Chemicals facility in Berre L'Etang and is operated by Shell Petrochimie Mediterranee. "We

decided to re-direct our technical resources and investments to businesses where Dow can achieve an advantaged cost position and increase our share of differentiated products," said Craig Arnold, global business director for Dow Europe Synthetic

Europe. Co-PBR is used in tire tread and sidewall compounds, conveyor belts, footwear, golf balls, a variety of mechanical goods, as well as for impact modification of polystyrene.

www.dow.com

Lyondellbasell to Stop HMS Polypropylene Production

Lyondellbasell has announced it will stop producing high melt strength (HMS) polypropylene at its Varennes, Quebec site in April. The HMS unit is expected to continue normal operations until then. Yves Bonte, senior

vice president of polypropylene said, "In light of our previously announced decision to close our Varennes site, where the HMS unit is located, further study concluded that continued HMS polypropylene production is not

economically viable. Lyondellbasell has no alternate manufacturing capacity to produce HMS polypropylene."

www.lyondellbasell.com

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Akzo Nobel: New Structure

Akzo Nobel has finalized plans for the new structure of the company in line with its acquisition of Imperial Chemical Industries (ICI). The integrated organization will operate in three business areas: Decorative Paints, Performance Coatings and Specialty Chemicals. Under this more focused structure, ICI's retained Specialty Polymers and Regional and Industrial activities will move to Akzo Nobel Specialty Chemicals, while ICI's Packaging Coatings operation will join Akzo Nobel's Performance Coatings portfolio. ICI's deco activities will be part of the new Akzo Nobel Decorative Paints organization, which will consist of seven businesses.

"We have in place the organization, the people, the technology and the products to move forward and continue to grow, confident that we will carry on delivering great service to our customers and profitable

returns for our shareholders," Akzo Nobel CEO Hans Wijers said.

The new structure of Akzo Nobel will be as follows:

- The Decorative Paints business: Decorative Paints Continental Europe; Decorative Paints Northern & Eastern Europe; Decorative Paints UK, Northern Ireland and South Africa; Decorative Paints Asia; Decorative Paints America; Decorative Paints Canada; Decorative Paints Latin America.
- The Performance Coatings business: Car Refinishes; Marine & Protective Coatings; Powder Coatings; Industrial Finishes; Packaging Coatings.
- The Specialty Chemicals business: Base Chemicals; Functional Chemicals; Polymer Chemicals; Pulp & Paper Chemicals; Surfactants; Specialty Polymers; Regional & Industrial activities.

► www.akzonobel.com



Brandi Schuster

A Few Words from the Editor

Job Cuts Despite Profit – Cutting Off the Nose to Spite the Face?

What does it take to win job security – high demand of the products one makes? Increasing profit year after year? There was a time when that was the case – companies reported increases in orders and in overall profitability, and employees could rest assured that their jobs were indeed secure for the time being. But on a recent Wednesday, when both Henkel and BMW announced plans for initiatives that could result in massive lay offs – despite both companies reporting profit increases over 2007 – it became clear that the notion of job security will soon become a relic of the past.

Considering the current climate in the chemical industry, it is understandable that a company like Henkel wants to stay ahead of the game. With stiff competition on the market, it is not as oxymoronic as it seems to lay off workers as sales increase. When things are doing well, a company cannot rest on its laurels and expect the good times to continue. Henkel said its plan is to increase long-term profitability and competitiveness, which will save the company €150 million from 2011. One could argue that the loss of upwards of 3,000 jobs is the sacrifice a company has to make to secure its own future and that of its remaining employees.

That was the situation on that Wednesday – two long-standing German companies, both announcing profit increases and job cuts. Call it coincidence or bad timing – or both – that the announcements came on the same day. Both companies reported suffering from the effects of high raw material prices, a problem that can be seen across most industries. Other problems plaguing the industry include the high price of crude and the weak dollar. Of course, all of these problems are short-term in nature.

What gets lost by the wayside, however, is the psychological affect announcements like those from BMW and Henkel have on the rest of the working population, particularly when they come on top of each other. When people hear that successful, well-rooted companies are looking into job cut backs despite profit wins (not to mention raising the dividends), then uncertainty becomes palpable and a vicious circle begins. Out of valid concern that their jobs may not be there tomorrow, people begin to hold on to their hard-earned cash instead of spending it, which can to a drop in domestic demand, which can lead to even more jobs cuts.

While both Henkel and BMW have valid reasons behind their planned initiatives, the possibility looms that the announcement of these job cuts will come back to haunt them in the form warehouses full of products that only few can afford. Nevertheless, such programs like Henkel's "Global Excellence" are becoming more and more en vogue across all sectors; time will tell if this approach will bring the desired results or not. If not, Henkel and other producers of consumer-care goods will be the first to feel the effects.

Brandi Schuster

chemical reaction

Biotech Crop Decision Not Eco-friendly

The French Government's decision to invoke the safeguard clause on biotech maize contradicts the conclusions of the French Environment Round Table (Grenelle de l'Environnement) and government policy on ecological and sustainable development. The report from the provisional high authority, states that there was not sufficient time to review all literature. Furthermore, 12 of the high authority's 15

scientists disagree with the authority's conclusions and said that they never found evidence for serious doubts or negative consequences concerning genetically modified crops, plus two of the socio-economic experts, which make a total of 14 experts from the high authority, are criticizing the way the conclusions are worded.

► www.europabio.org

Singapore: Investments Increase in 2008

Singapore's Economic Development Board said it expects investments in the manufacturing sector this year to rise to S\$12-14 billion from S\$11.6 billion in 2007 despite expectations of a global economic slowdown. The new investments in 2008 are expected to create 16,000-19,000 skilled jobs. The investments committed in 2007 will generate some 18,500 jobs. Among the key projects announced

in 2007 was the multi-billion dollar petrochemical expansion project of Exxon Mobil, expected to be completed in 2011. Finland's Neste Oil is also building S\$1.2 billion biodiesel manufacturing facility in Singapore, while Switzerland's Novartis is building a new drug manufacturing facility.

► www.sedb.com



PORTFOLIO

Vopak Barging Europe to be part of Interstream Barging Royal Vopak said it has reached agreement in principle with Interstream Barging and Van der Sluijs Groep on the contribution of its entire subsidiary, Vopak Barging Europe, to Interstream Barging, an existing joint venture of Vopak and Van der Sluijs Groep. At the same time, it has been agreed that Van der Sluijs Tankrederij, a subsidiary of Van der Sluijs Groep, will also be contributed to Interstream Barging. All activities will then take place under the name Interstream Barging. In this way, Interstream Barging, which is established in Dordrecht (the Netherlands) and Düsseldorf (Germany), will extend its existing area of operations of transporting mineral oils into the shipment of chemical products. The merger of Interstream Barging and Vopak Barging Europe will be in the form of an acquisition of all of Vopak Barging Europe's shares by Interstream Barging and has no consequences for the employees of either organisation.

► www.vopak.com
 ► www.interstreambarging.com
 ► www.sluijsgroep.nl

Statoilhydro Acquires Brazilian Operator Anadarko Statoilhydro and Anadarko have signed an agreement whereby Statoilhydro will take over the remaining 50% in the Brazilian Peregrino project, which will give Statoilhydro a 100% working interest and operatorship of the development. The Peregrino field is located in the Campos Basin offshore Brazil; expected reserves in this heavy oil field are estimated at approximately 500 million barrels, excluding identified upsides. The field is expected to come on stream in 2010. In addition, Statoilhydro is acquiring Anadarko's 25% interest in the Kaskida discovery in deepwater US Gulf of Mexico. For these assets Statoilhydro will pay Anadarko \$1.8 billion, plus a maximum pre-tax value of \$300 million related to the Peregrino field to be earned by 2020, conditional on future oil prices above pre-defined threshold levels.

► www.statoilhydro.com

Lyondellbasell Expands Business Lyondellbasell, a manufacturer of polymers, chemicals and fuels, has completed the acquisition of Solvay Engineered Polymers, a supplier of polypropylene compounds in North America. "The acquisition of Solvay Engineered Polymers demonstrates our commitment to support our automotive OEM and Tier I customers with high performance products and innovative solutions," said Paul Yeates, Senior Vice President of Lyondellbasell's Advanced Polyolefins Business. The combined North American business will be headed by Steve Dwyer, Vice President of Lyondellbasell's Automotive Americas.

► www.lyondellbasell.com

Dyneon Acquires Hitech Polymers Dyneon, a 3M company, said that it has acquired the business of Hitech Polymers, a manufacturer of specialty thermoplastic polymers and provider of toll thermoplastic compounding services based in Hebron, Ky. (U.S.) Terms of the transaction were not disclosed.

► www.dyneon.com

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EVENTS

Profibus Focuses Annual Conference on Users Profibus UK will conduct their fifth annual conference June 24–25. Acknowledging the increased interest in Profinet, the event has been renamed the Profibus & Profinet User Conference. The 2008 conference will continue to concentrate on the real issues of implementation, maintenance and management of Profibus and Profinet systems, from a user perspective. Speakers will present their experience as installers and users of such systems. The conference is designed for end users including installation and maintenance personnel, system designers and decision makers including managers and indeed anyone concerned with the real issues of implementing fieldbus and/or industrial Ethernet technologies.

► www.profibus.com

New Pharma Technologies The New Directions in Chemical Process Design Conference will take place April 10–11 in Freiburg, Germany. The conference is taking place with the support of BioValley, the life science cluster for the bioregions of Alsace, France; South Baden, Germany and northwest Switzerland, with centres in Strasbourg, Freiburg and Basel. The conference will feature new technologies for pharmaceutical intermediates and ingredients, and include presentations from industry and academe covering the application of new chemistry in the fields of chiral synthesis, aromatic compounds, catalytic processes and biocatalysis in pharma discovery, development and manufacture.

► www.biofineurope.com

CBA Diamond Award Winners

Chemical Business Association (CBA) announced its Diamond Award winners for 2008 at a ceremony in Manchester on Feb. 6. Three awards, Diamond Award, recognising distinguished service, European of the Year and the Responsible Care Award were aimed to celebrate excellence and outstanding achievement. The Diamond Award was awarded to John McKenzie, vice president, sales and marketing, Univar Europe. CBA's Award

for European of the Year was presented to Danny De Cock, the manager of the industry's safety and quality assessment system on behalf of Cefic, the European Chemical Industry Council. CBA's Responsible Care Award, presented to BOC Packaged Chemicals, aims to recognise a company that has made an outstanding commitment to the programme and taken a pro-active approach to responsible care.

► www.chemical.org.uk

Clariant Receives Henkel Award

Henkel presented Clariant its award as "Best Innovation Contributor" for 2007. The award recognizes Clariant for delivering outstanding consumer-relevant innovation with the Detergents product line Texcare. The prestigious award was presented by Henkel's Laundry & Home Care business in a special ceremony at the recent 2008 Soap and Detergents Association annual meeting and industry convention in Boca Raton, Fla. During the

ceremony, Henkel saluted Clariant's Texcare as "the best contribution from an external partner in delivering outstanding consumer-relevant innovation, resulting in a product of highest market value." In recent years, detergent manufacturers have scored a number of successes in developing new formulations that work at lower water temperatures without compromising product effectiveness.

► www.clariant.com

Please send your event information to
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PEOPLE

Personnel Change in Rhodia's Executive Committee Rhodia has appointed Pascal Juery as president of Rhodia's Novocare Enterprise. Previously group purchasing vice president, he is succeeded in this function by José Matias. Matias and Juery are members of Rhodia's executive committee. Juery began his professional career as an internal auditor at Rhône-Poulenc in 1988. He became Rhodia Novocare's general manager for Europe, as well as the global business leader for the Home and Personal Care marketing 2004. He was appointed Rhodia vice president purchasing in Jan. 2007. Matias began his professional career with Rhodia in Brazil in 1983. He took up various manufacturing and investments assignments in Brazil and in France. In 2007 he was appointed supply, energy & public affairs vice president of Latin America.

► www.rhodia.com



Matthew Hellstern

Matthew Hellstern to Head Chemtura Urethanes Matthew Hellstern will assume leadership of the Chemtura Urethanes business unit as vice president, announced CBO and Group President Robert Wedinger, Chemtura Corporation. Hellstern replaces John Dennerlein, who will lead the Industrial Lubricants & Additives unit in Chemtura's Petroleum Additives business. Hellstern also will continue as vice president of Performance Specialties Products.

Joining Chemtura in 2006, Hellstern was responsible for the management and divestiture of Chemtura's Fluorine business, as well as the acquisition and integration of Kaufman Holdings Corporation.

► www.chemtura.com

Bristol-Myers Squibb: Key Management Changes Bristol-Myers Squibb announced that the company's board of directors has elected Jean-Marc Huet senior vice president and chief financial officer, effective March 31. In this role, Huet will be responsible for directing and managing the company's fiscal operations, as well as the global financial operations of the organization and its subsidiaries. Andrew Bonfield, executive vice president and chief financial officer, will remain in that role until Huet's arrival. He will leave the company after a period of transition to seek new career opportunities.

► www.bms.com



Nance Dicciani

Praxair Board Nominates Dicciani of Honeywell Nance Dicciani, president and CEO of Honeywell Specialty Materials, has been nominated for election to the Praxair board of directors. If elected by the shareholders at Praxair's annual meeting in April, she will join the board effective Sept. 1. In 2006, Dicciani was appointed by President George W. Bush to the President's Council of Advisors on Science and Technology. She also currently serves on the board of directors and executive committee of the American Chemistry Council and has chaired the board's Research Committee. She has been ranked twice as one of "The World's 100 Most Powerful Women" by Forbes magazine, and was named as one of the "Top 40 Most Important People in the Chemical Industry" in 2006 by Chemical Business.

► www.praxair.com



Dr. Wolfram Frank

Wolfram Frank Appointed Isopa Secretary General Dr. Wolfram Frank, formerly of Elastogran, will take over as secretary general of Isopa (the European trade association for producers of diisocyanates and polyols) to succeed Mike Jeffs on April 1. After earning his Ph.D. at the University of Aachen, Frank joined BASF and has worked in the polyurethanes area since 1982, in research and in commercial roles in the U.S., Hungary and as managing director for Elastogran in France from 1992 to 2005.

► www.isopa.org



Gabriele Henke

NRC Appoints Gabriele Henke Managing Director Nordmann, Rassmann (NRC) has come up with an internal succession regulation for managing director Wolfgang Nagel. Starting on April 1, Gabriele Henke will become new managing director of Nordmann, Rassmann with its principal place of business in Hamburg. At the same time Dr. Ulla Seidel-Wiese will take over Henke's previous position within the company, management of the business unit of cosmetics, pharmaceuticals as well as food additives and raw materials. Simultaneously she will receive the power of procurement.

► www.nrc.de



Frank Halder



Elisabeth Schick



Dr. Wolfgang Gerhardt

Changes on BASF's Communications Team

BASF has announced that Frank Halder will head Corporate Communications Europe at BASF effective May 1. He will succeed Elisabeth Schick, who will become the new head of BASF's Corporate & Governmental Relations department as of the same date. Schick will succeed Dr. Wolfgang Gerhardt, who will become responsible for the Safety, Security & Emergency Response department.

► www.basf.com



Dr. Ulrich von Deessen

BASF Names First Climate Protection Officer Dr. Ulrich von Deessen has been named the first climate protection officer of BASF. As of May 1, he will also become the head of the global Competence Center Environment, Health and Safety as the successor of Ernst Schwanhold. Schwanhold will take over projects within BASF and will retire as of Dec. 1. The climate protection officer will be a member of the Sustainability Council and will coordinate all of BASF activities in this area worldwide. Von Deessen has been chief of staff to the chairman of the Board of Executive Directors of BASF since 2003. He joined BASF as a researcher in 1987. Schwanhold has been with BASF since Jan. 2004, and since March 2004 head of the Competence Center Environment, Health and Safety.

► www.basf.com

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Leaps And Bounds

The Markets for Industrial Biotechnology Plentiful

Biotech Explosion — Industrial biotechnology — also called white biotech — is the fastest growing segment of the biotechnology industry. This segment has the potential to be bigger than all of the rest of biotechnology put together, and there is no stopping its momentum.

The world is quite different than it was even five years ago. Technology itself has advanced at an ever-increasing rate, and tools like bioinformatics, genomics, directed evolution, flux analysis, metabolic engineering are now here and picking up speed. This increase in speed, decrease in cost and the ability to do things that have never been done before are driving down new product development times and cost. Now it is often faster and cheaper to bring out new biotech products than traditional chemical products.

The rising cost of petroleum feedstocks has made biological routes cheaper than chemical ones in many cases. Agricultural feedstocks are available and providing renewable alternatives that were once uneconomical to develop; we are now seeing competition for agricultural products, which is driving up the cost of food. However, this is temporary as technology is now being developed to take non-food crops and crop wastes into use. Additionally, agricultural crops are expandable into new acreage and as biotechnology is used to improve the crops, yield per acre on existing crops is delivering results. In 10 years, yield per acre on corn alone should double. The use of grasses and other crop types will bring major portions of land that is now not used for crops into play.

Looking down the value chain, the consumer product companies and the consumers themselves are set to benefit. Consumer product companies use large volumes of chemicals whose prices are rising dramatically due to increase prices for petroleum based raw materials. Consumer product companies — and even the distribution channels — are encouraging the biotechnology companies to bring forth low-cost solutions in the form of products, which have more stable costs, perform the same functions and in many cases are the same products than now are based on petroleum. Now more than ever, bulk, performance and fine chemicals are being developed using biotechnology. These biotechnology-based solutions also have the benefit of being less environmentally polluting and actually have the potential to reduce the greenhouse gases.

Individual Market Dynamics — Key Markets

Energy — With a market that can only be measured in trillions of dollars, energy is one of the largest businesses worldwide — and is without a single technology solution. The first generation biotechnology solutions have appeared in the form of ethanol and biodiesel, but this is merely the tip of the iceberg. Large-scale biorefining is just beginning, and new second-generation biofuels are being developed, such as butanol. Industry and the public want quick answers, but there are none.

Clearly, biotechnology is the only renewable technology that can provide some partial answers in the next 10 years, which is a short time span which one takes energy and past solutions into consideration. During the first 25 years of the petroleum industry, refiners did not know what to do with a by-product stream — so they burned it. That by-product is now driving the industry — it is called gasoline today. Five years ago, most petroleum companies were unaware of biotechnology and the role it could play. Today, virtually every major petroleum company is embracing biotechnology in some form as one of many technologies that can make a difference. Sales of biotechnology products to this industry are measured in the billions of dollars per year, and these numbers will only grow as time goes passes.

There are even races within biotechnology to impact energy. Many different processes are being developed as well as products. Additionally, new and improved crops, and new methods of harvesting are being developed. In the field of energy, national governments are encouraging new technology development. The U.S. Department of Energy is funding biomass demonstration plants. It is clear that the U.S. considers biological solutions to energy as a top priority for several reasons, including a drive to self-sufficiency, which has economic, technological, and even homeland-security implications.

Bulk and Specialty Chemicals — Global demand has risen while global supply has not risen accordingly. Global market size for bulk and specialty chemicals is also in the trillion-dollar range. There are over a hundred bulk chemicals and thousands of specialty chemicals that have sales of greater than a billion dollars.

The chemical market is suffering from higher prices, which are driven by petroleum raw material price increases and short supply. Additionally, plants that have been running at near capacity for some time are being shut down for maintenance, causing even more shortages of supply. The scale of these chemicals is usually quite large, requiring large investments of capital. Bulk chemical plants are especially large to reach economies of scale. Most bulk chemical companies are also integrated downstream and make derivative, meaning that capital expansion often not only involves a certain product but expansion of downstream products as well.

Over the next few years, many bulk chemicals are being targeted. Some examples are acrylic acid, succinic acid/maleic anhydride, butanol, and propylene glycol.

Specialty chemicals are usually lower in volume and carry some kind of performance characteristic. Market segments of specialty chemicals are then based on a price/performance basis. This added dimension — over bulk chemicals — adds a level of complexity.

Product areas in specialties that are targets or have products include antioxidants, sweeteners, surfactants, cosmetic actives, and nutritional products.

Fine Chemicals — Fine chemicals are benefiting in many ways from biotechnology. This market is hundreds of millions of dollars with individual opportunities in the \$1-10 million range. First, complicated metabolites can be used to build a family of drugs. Some examples are antibiotics, antirejection drugs, and anticancer drugs.

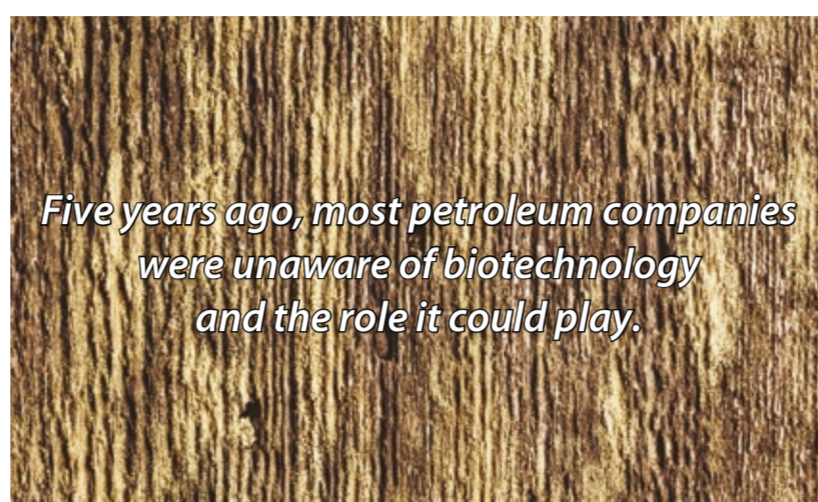
Chiral compounds are made with enzymes or biotransformations. Many of these compounds are hard to make by chemistry. Single enantiomer drugs with several chiral centers are also resolved or made using enzymes.

Drug structures are getting more complex and the use of the above technologies not only are making an impact now but they will be used in ever increasing frequency.

Polymers — The worldwide polymer market is measured in the hundreds of billions. Polymers, like specialty chemicals, have a price/performance aspect to them. Because most polymers are based on petroleum, the prices of these plastics have increased and will continue to increase. Many polymer companies have yet to catch up on the price increases of their raw materials. Innovation in new polymers based on traditional chemicals has slowed quite dramatically, with no real new entrants in the last 20 years.

The three key polymers from biotechnology recently are PLA (polylactic acid), PHAs (poly hydroxy alkanates) and polyesters based on bioderived 1,3 propanediol (PDO). Additionally, some of the traditional polymers are being based on renewable resources once derived from exclusively from petroleum. Dow and Braskem are both developing ethanol-based ethylene to make polyethylene in Brazil.

As time goes on, existing monomers and new polymers will be made using biotechnology. Monomers like acrylic acid, maleic anhydride, butanediol, and adipic acid are targets.



Five years ago, most petroleum companies were unaware of biotechnology and the role it could play.

Polymers will also be under development like polyamides, polyesters, cellulose-based polymers and many other classes of polymers.

Fibers — Fibers are natural or synthetic and are large volume products. Fibers are also in the hundred of billions of dollars. Textiles and floor coverings dominate usage. New fibers are not usually undertaken by small companies as technology, capital expenditures and the large volume. Specialty fibers have much higher prices and lower market volumes.

Biotechnology is impacting raw materials for fibers. DuPont's bio-PDO is bringing new performance characteristics to polyesters at lower costs. It is aimed at competing with nylon in the carpet area and is finding new uses in the textile area. As biomass comes along and cellulose is processed into sugars, new cellulosic fibers (sizes and shapes) and possibly new cellulosic derivatives may well blossom onto the scene.

Coatings — The coatings industry is comprised of polymers, solvents and co-solvents, surfactants, coalescing

aids and many additives. Polymers are now being based on renewable resources, green solvents are being developed and surfactants and coalescing aid are also being developed using renewable resources. This market is in the hundreds of billions of dollars.

Rising prices of petroleum-based products are creating an opportunity for renewable resourced products. Henry Ford was proud that his automotive coatings were based on soybean oil, and now it appears that the past is being reinvented. Many coating polymers are now being formulated with monomers that soon could be based on renewables rather than petroleum.

Nutrition — Nutritional markets are large and span the spectrum from vitamin tablets to infant formula as well as enteral and parenteral products. Making nutrition available to special groups people is a big business. Here the markets are billions of dollars per year.

DSM has indicated in the long run all vitamins will be based on biotechnology routes, and the conversion has already begun. Amino acids are made by fermentation with the exception of methionine and biotechnology routes

to that amino acid are near commercialization.

Microorganisms are making omega-3 fatty acids and more penetration of this category is planned for biotechnology routes.

The prospect of more nutrients being made available using biotechnology to make them is real. These new nutrients will be taken through many clinical trials. This is an exciting area for biotechnology and we are just beginning to see the effect.

Summary

Industrial biotechnology will continue to penetrate these markets at an every increasing rate. It is hard to imagine any major market that uses organic chemicals today that will not be impacted by industrial biotechnology.

It is an exciting time to be involved in an industry that is growing by leaps and bounds.

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Improving The Supply Chain

A Global Chemical Industry Best Practices Study Shows How

Remaining Competitive
— For many businesses today, the supply chain is an increasingly important factor in driving both efficiency and competitiveness – and the chemical industry is no exception.

Executives at chemical companies see the supply chain as critical, and their companies have devoted significant effort to improving their supply chains in recent years. However, those efforts aren't always producing lasting improvements and sustainable results. They often are hampered by fragmented approaches and a lack of sophisticated tools, which can lead to inaccuracy, inefficiency and missed opportunities to achieve higher levels of business performance.

Those observations are based on findings from Accenture's "2007 Global Chemical Industry Supply Chain Best Practices Study." The second in a series – the first study was done in 2005 – this research was conducted under the guidance of a steering committee made up of representatives from major chemical manufacturers.

The results of this research clearly underscore the growing importance of the supply chain in the industry. Faced with challenges such as global competition and global customers, increasingly complex operations and rising logistics costs, a growing number of chemical companies are focusing on the supply chain. In the 2007 study, more than three-quarters of respondents said that the supply chain is a driver of operational excellence or a significant source of competitive advantage. That view is supported by other Accenture's research, which shows that solid supply-chain-management capabilities can be key to enhancing business performance. In addition, a team of researchers from Accenture, Stanford University and the French business school Insead found that the average market capitalization of companies that utilize supply-chain best practices outpaced the industry average by 7% to 26% over a three-year period.

With this growing importance of the supply chain in mind, the "2007 Global Chemical Industry Supply Chain Best Practices Study" looked at a broad range of supply chain topics, including several that are especially relevant to chemical manufacturing operations. These include demand planning, supply and materials planning, production scheduling, and inventory target setting and deployment.

Demand Planning

Like the 2005 study, the 2007 research found that chemical companies are using a wide variety of tools to perform demand planning and are seeing varying degrees of effectiveness. Nine percent of respondents said their firms rely on basic rules of thumb to plan, while 36% cited simple models that extrapolate historical demand, and 40% legitimate forecasting techniques. In terms of technology used, demand planning is frequently performed as a spreadsheet exercise. Forty six percent indicated that they manage demand planning using tools such as Excel or Access, while another 24% rely on off-line forecasting tools that draw on structured, downloaded Enterprise Resource Planning (ERP) data. Twenty seven percent said that their demand planning tools are fully integrated with their ERP.

The study also looked at planning accuracy at various levels of detail, such as product family, product and location. Not surprisingly, the research found that the ability to forecast accurately falls off quickly below the product level, with error levels of 25% to 35% at the product/customer, product/package and product/package/supply-point levels. Nevertheless, more than 85% of respondents said that they are attempting to forecast at the product/customer level. A better approach would be to use the more-accurate aggregate forecast and then apply business rules to that forecast to develop lower-level demand plans.

Collaboration gets a lot of attention in the supply chain arena, but 16% of respondents indicated that they don't collaboratively plan with their customers at all. More than three-quarters of those who said they do plan collaboratively with customers also said that they don't have any means of measuring the benefit of such collaboration.

The variety of tools and approaches used for demand planning points to a range of sophistication and effectiveness – and indicates that there's often an opportunity for improvements that could have significant benefits. As many in the chemical industry know, weak demand planning ripples throughout manufacturing and the supply chain and ultimately makes the achievement of superior performance a challenge.

Supply And Materials Planning

The research shows that chemical companies continue to make progress in the effort to bring increased flexibility to manufacturing through two fundamental practices: the standardization of formulations across facilities, and the retention of decision-making about what facilities to use to produce particular customer orders (as opposed to having the customer make that determination).

In the 2007 study, 60% of respondents said formulations are consistent across all plants, and 22% said sourcing decisions are handled by the producer. Thirty seven percent noted that formulations are consistent across some but not all locations, and 67% indicated that they control some but not all sourcing decisions. And on the low end of the flexibility spectrum, 3% of respondents said that their formulations aren't consistent across facilities, and 11% indicated that their customers determine production locations. Overall, this picture shows progress since the 2005 study, in which only 45% of participants reported consistent formulations across all plants and 20% indicated that sourcing decisions were at their discretion.

Demand/Supply Balancing

In this area, often known as supply and operations planning (S&OP), chemical companies have seen some improvements in the last two years. For example, in terms of collaboration, 53% of respondents in 2007 said that related business units routinely share demand/supply data, up from 41% in 2005. Thirty seven percent indicated that they share such data periodically, and only 10% said that there's no such communication between business units.

The breadth of participation in the S&OP process has also increased since 2005, with more than 70% of all respondents indicating broad functional representation on the S&OP team, with members coming from

areas such as customer service, commercial, finance and supply-chain management.

At the same time, however, there's clearly room for improvement. In looking at the "frozen period" used for S&OP, 45% of respondents cited one month and 24% said they use a shorter period – but 28% indicated that they had no frozen period in effect. Not surprisingly, given these varying approaches, the volume variance experienced by respondents covered the full range from 0% to 100%.

Meanwhile, the execution of the S&OP process is not uniformly strong among respondents. More than three-quarters reported having reliable accurate data feeding frequent responsive S&OP processes, but 17% said they were working with unreliable inconsistent data. In addition, less than half the respondents reported having optimization capabilities or frequent audits to improve their processes.

Production Scheduling

Production scheduling appears to be an area where there's relatively little opportunity for major improvements. Many respondents said that their companies have integrated scheduling technology, that they have been using those tools for five or more years, and that they are at least moderately satisfied with those tools. Many noted that they are able to re-plan on a weekly basis and the process takes less than a day.

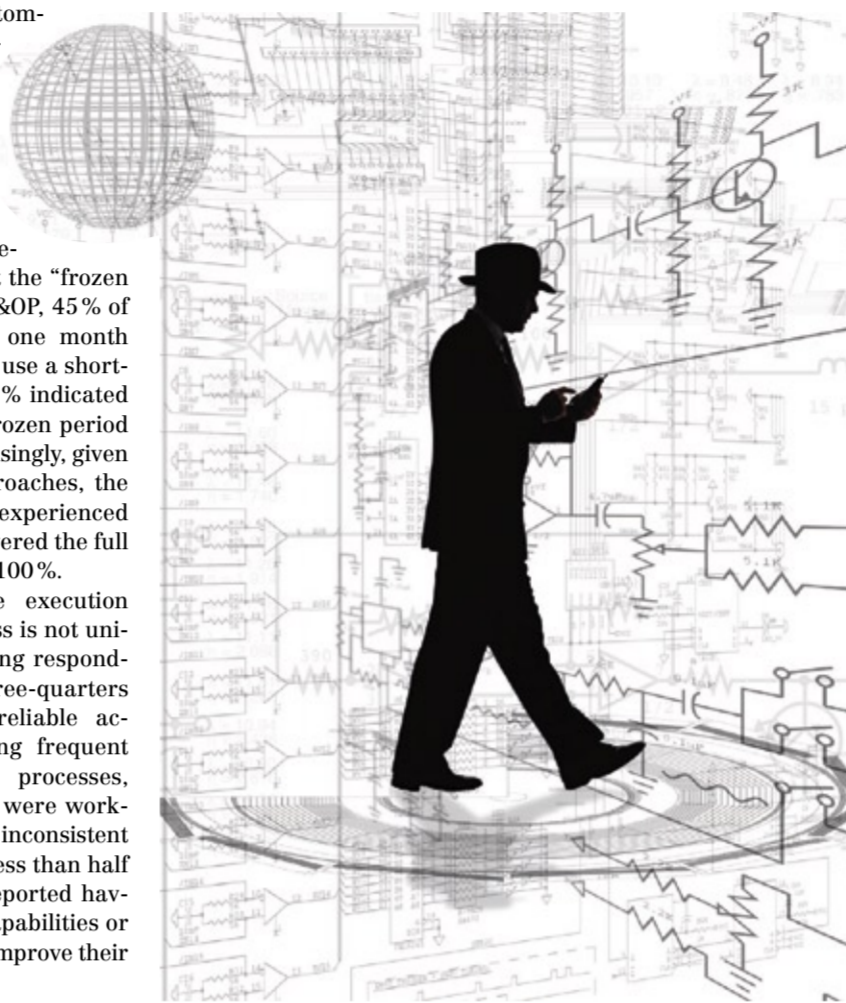
For both unplanned transitions and schedule variance, companies appear to be hitting their targets. Across the study population, unplanned transitions – that is, changes to products or campaigns that were not in the plan one month earlier – were targeted and realized at about 20%. For schedule variations – that is, times when operations deviate from the production plan – targets averaged 20% for make-to-stock and 24% for make-to-order. Actual results were 25% and 28%, respectively.

For many companies, production data or triggers are available during the production run and their near-real-time links to the order-promising function. Here again, the 2007 findings show improvement from 2005, when it was more common for companies to have to wait until the end of a shift or even the next day to see what was going on in manufacturing.

Inventory Target Setting and Deployment

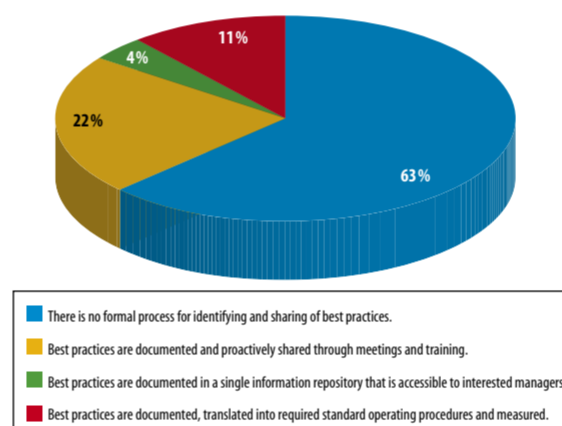
When it comes to managing inventory, 50% of respondents said that their supply chains are predominately demand-driven, while 46% said their supply chains are a balance of production- and demand-driven. Only 4% of the participants' supply chains are predominately driven by production constraints.

It's encouraging to see that 57% of respondents used statistical techniques to determine inventory levels while another 36% target a predetermined number of days. Meanwhile, 36% of participants have a process for regularly monitoring and correcting inventory levels. Forty six percent indicated that, although they regularly monitor inventory levels, resolving imbalances is a challenge because of demand or supply variability. Eighteen percent said that they only conduct periodic initiatives to correct inventory levels.



Accenture's 2007 research found that chemical companies are using a wide variety of tools to perform demand planning and are seeing varying degrees

Sharing of supply chain best practices



Source: Accenture

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The Critical Commercial Connection

The 2005 Accenture supply chain study uncovered a number of issues around the impact of front-end commercial decision-making on the supply chain. As a result, this year's study included a separate section that explored the commercial end of the supply chain and practices such as customer segmentation,

SKU (stock keeping unit) management and pricing.

The activities of the commercial functions – such as sales and marketing – may seem somewhat beside the point for those involved in manufacturing but, in fact, they are highly relevant. The decisions made in sales and marketing affect the entire supply chain – and they are, unfortunately, often

made without input from manufacturing. Indeed, in the 2005 study, it was clear that at many chemical companies commercial decisions are made by the sales and marketing functions and largely "inflicted" on manufacturing and supply chain operations.

The 2007 study looked at a number of commercial-function activities that have an impact on manufacturing operations, including:

Policies – The research showed that policies that directly affect chemical companies' manufacturing operations often aren't clearly documented or enforced. This makes it difficult to optimize manufacturing.

Customer segmentation – Many respondents reported that their companies don't have a solid grasp of the profitability of sales to individual customers. That lack of understanding typically leads to problems such as providing too high a level of service to too many customers, which in turn translates into schedule variations, excessive changeovers and special services being provided without an appropriate premium being charged.

SKU management – Only about half the respondents said that their companies balance the production efficiency objectives of manufacturing with commercial needs to determine the SKU portfolio. Fifteen percent said that commercial needs drive the portfolio, while 30% noted that efficiency goals do so. Participants who said that they used a balanced approach to SKU management reported that, on average, 96% of their portfolio was profitable, compared to the 91% average profitability among respondents who didn't balance manufacturing efficiency with commercial needs.

As one might expect, the numbers are similar for the degree of customization that companies will tolerate. That is, 15% of respondents indicated significant levels of customization – essentially the same 15% who said that commercial needs drive SKU decisions. On the other end of the spectrum, 19% said they had little or no customization. Although some level of cus-

tomization occurs among more than 80% of respondents, less than half charged a premium to recover the associated costs.

Ample Opportunities Remain

The results of the Accenture's "2007 Global Chemical Industry Supply Chain Best Practices Study" highlight several strengths of chemical companies in terms of the supply chain. More importantly, they also highlight several areas where significant progress still can be made. In particular, key opportunities lie in addressing the commercial functions and the way they relate to the rest of the supply chain. For example, chemical companies can take steps to more thoroughly document commercial policies and can establish mechanisms for enforcing and monitoring those policies. Doing so is likely to have positive ramifications far up the supply chain.

Companies also can focus on giving manufacturing and supply chain operations a seat at the table in commercial decision-making. That way, those operations will have a clearer view of the commercial requirements that they'll need to support. At the same time, they'll be in position to inform the commercial processes so that sales and marketing can factor manufacturing and supply chain realities into commercial decisions – and everyone can work together to address potential issues early on.

The chemical industry's efforts to improve the supply chain are ongoing and so too is the 2007 study. Rather than a one-time snapshot, it's designed to be a continuing exploration; companies interested in participating should contact Accenture. The goal, ultimately, is to draw on the broad experience of numerous chemical companies to develop knowledge and insights that can help the industry strengthen its ability to use the supply chain as key driver of high levels of business performance.

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Advanced Inventory Management

The Path to Inventory Management Excellence?

Meeting Demand — Information is substituting inventory is a much-lauded statement in today's supply chain community discussions. But the information on the non-availability of desired goods does not provide much benefit when trying to meet the customer demand.

Inventory management is one of the hottest topics in supply chain management. After describing the relevance of inventory management in today's supply chains this article outlines important steps towards Inventory Management Excellence with special respect to the role of inventory optimization software.



PLENTY FOR ALL – Inventory management excellence can be achieved through the right kind of software; this ensures that customer demands are met.

(Photo by kay_1 / Photocase)



Stefan Rügge,
Supply Chain
Management Consultant

located. Therefore a company's performance on inventory management, besides operating costs and provided service level, can be seen as an ideal indicator on the overall SC performance. But to determine the optimal inventory level for the whole supply chain one has to consider which amount of which product has to be stored at which stage with respect to multiple variables and constraints (e.g. lead times, costs, demand volatility and service level). For chemical companies this implies the consideration of the allocation of inventory levels for packed, bulk and intermediate goods and special constraints like perishability, silo and tank capacities. The leaner the organization becomes the higher its supply chain operations are vulnerable to disruptions or external influences. Therefore, safety stocks should be debated as one tool of an overall approach to mitigate substantial supply chain risks like the possibility of a plant break down or demand fluctuations.

Nevertheless, a growing number of chemical companies as well as economic scientists have estimated and validated a realistic inventory reduction by 20–30% by applying state-of-the-art inventory management approaches.

Steps to Inventory Management Excellence

First of all, companies have to create awareness on the potential which emerges from the application of advanced inventory management approaches and thus the company-wide ambition to improve the current performance. At this stage a company has to evaluate the current inventory situation and management capabilities to identify potential improvements. Therefore an analytic tool which is able to support a business case calculation is needed.



Industry Challenges

Today's chemical supply chains are confronted with the challenge to manage complex production operations on the one hand, with rising customer requirements and increasing demand volatility on the other. The easiest way to overcome this dichotomy is to decouple the supply and demand side by using enormous inventory levels. This, of course, does not lead to a sustainable competitive position in today's business environment as the inventory situation of most chemical companies provides an enormous opportunity to reduce asset costs.

Viewing inventory as an enabler in terms of running optimal operations while providing superior customer service level is only one side of the coin. Analogically, a pure cost center approach on Inventory Management falls short of the requirements of superior supply chain management (SCM) practices.

From the strategic point of view, SCM is about the decisions concerning centralization and decentralization, direct and indirect processing, and postponement and speculation. Derived decisions mainly determine the order penetration point within the supply chain, where inventory is usually

actual sales trends, product life cycles and upstream capacity requirements must be considered by introducing an integrated sales and operations planning process to enable demand driven adjustments on production planning decisions.

Embedding central supply chain management governance responsible for the overall inventory situation would be the final step. To avoid passive reactions on KPIs, the use of multi-echelon software solutions provides a valuable enhancement for centralized decisions on the overall inventory allocation. Therefore, every stage within the value chain safety and cycle, pre-build stocks and all relevant param-

eters like lead times or lot sizes have to be processed into comprehensible results. At this stage industry optimization software can not calculate ideal solutions. Nevertheless guidelines for different improvement scenarios should be provided. These have to be evaluated within complex simulations to prepare decisions on inventory allocation and network configuration.

Most of the available industry optimization software enables companies to reduce costs in a very reasonable way but their dynamic multi-echelon tools only target the short run. Therefore, gaining sustainable competitive advantages through Advanced Inventory Management is more than us-

ing a black box providing static and dynamic heuristics improving local or even company wide stock levels. As software is accessible to anyone, a company needs an integrated approach towards inventory management which includes the ambition, the knowledge, the organizational ability and adequate processes to stay ahead of competitors. As outlined in the preceding paragraphs, improvements of the current inventory situation in the chemical industry can be quickly reached by using inventory optimizing software. The secret of transferring the current inventory practice into sustainability is to improve the whole supply chain organization.

Therefore, logistics information systems can provide a valuable support if they are adoptable to the companies' needs on their steps towards inventory management excellence.

The secret of sustainability is not just to use software but to be in the (excellent) position to challenge it.

Stefan Rügge

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Wacker Expects Records for 2007

According to its preliminary business results for fiscal 2007, Wacker Chemie saw a record year in terms of sales and earnings. The Munich-based chemical company boosted its sales by 13% to €3.78 billion (2006: €3.34 billion), thanks chiefly to volume gains and higher product prices. Earnings growth was double that of sales despite negative exchange-rate effects. EBITDA (earnings before interest, tax, depreciation and amor-

"We consider strong demand to be a key factor driving our ability to continue outpacing world GDP growth."



Peter Alexander
Chairman, Wacker

tization) reached €1 billion (2006: €786.3 million), up 27%.

The EBITDA margin was 26.5% (2006: 23.6%). Peter Alexander, chairman of Wacker, said: "We consider strong demand to be a key factor driving our ability to continue outpacing world GDP growth."

► www.wacker.com

Dupont Buys Fluorine Chemicals Business

Dupont said has completed its purchase of Chemtura Corporation's fluorine chemicals business. The acquisition includes all of Chemtura's fluorine business, along with the fluorine chemicals production unit that is part of Chemtura's manufacturing site in El Dorado, Ark. (U.S.), which will be fully integrated into Dupont's operations. All fluorine chemicals intellectual property rights will be transferred to Dupont. Approximately

25 Chemtura employees will become part of Dupont fluoroproducts. The move is part of Dupont's strategy to expand its fluorochemicals business offerings and to enhance its presence in specialty businesses such as the fire extinguishants, pharmaceutical propellants and fluoro-intermediate markets.

► www.chemtura.com
www.dupont.com

BASF Expects Green Light for Amflora

During its meeting in Brussels the EU Council of Agricultural Ministers passed BASF Plant Science's application for feed use of Amflora pulp on to the EU Commission. After an approval process that lasted more than 10 years, BASF Plant Science is now awaiting approval from the EU Commission. Amflora is BASF Plant Science's genetically optimized starch potato for industrial use such as paper making. Both proposals, for cultivation as well as feed, are based on positive evaluations of Amflora from the European Food Safety Authority (EFSA). EFSA stated that Amflora is for humans, animals and the environment as safe as any conventional potato. The application for feed use



has been submitted to allow the use of the pulp that remains after starch extraction as feed.

► www.basf.com

Arkema Acquires Repsol Business

Arkema has finalized the acquisition of the Repsol YPF group's PMMA sheet and block business. This activity will become part of its PMMA and Methacrylics business unit. Arkema said the acquisition will allow Altuglas International, an Arkema subsidiary, to bolster its position in the European PMMA sheet market. Repsol

YPF's PMMA sheet and block business operates from manufacturing sites in Brønderslev, Denmark, and Polivar, Italy. It achieves annual sales of the order of €30 million.

► www.repsolyypf.com
www.arkema.com
www.altuglasint.com

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Chemicals

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UNDER CONSTRUCTION

Lanxess Builds Butyl Rubber Plant Specialty chemicals group Lanxess is to build a butyl rubber production plant in Singapore with an annual capacity of up to 100,000mt. It is due to be commissioned in 2011. The plant will be constructed in the Tembusu Cluster of Jurong Island, a man-made island of around 3,000 hectares to the southwest of Singapore. The investment project is worth some €400 million, making it the largest ever in the history of the company. Lanxess has significantly expanded its two existing production sites in Zwijndrecht, Belgium and Sarnia, Canada in the last two years. Once the latest expansion phase in Sarnia is completed, the company will have an annual capacity totaling 280,000 mt of butyl rubber from 2009 onwards.

► www.lanxess.com

Praxair Upgrades Oxygen Pipeline System Praxair announced it will upgrade the production capability of its Gulf Coast oxygen pipeline system in order to meet growing demand for gaseous oxygen from pipeline customers under contract. Praxair will shut down a 30-year-old plant in Deer Park, Texas, and replace it with a new, state-of-the-art, energy-efficient air-separation plant in Texas City, Texas. The new plant, scheduled to start up in mid-2008, will have a capacity of 1,800 t/d.

► www.praxair.com

Aker Kvaerner: Contract for Peru Project Peru Copper Syndicate has awarded Aker Kvaerner a \$11.5 million contract for the provision of technical services for basic engineering and additional testwork for the Toromochi Project. The duration of the work is anticipated to be eight to ten months. The Toromochi Project is a large copper-molybdenum open-pit mine, located east of Lima, Peru. The plant capacity is 117,000 t/d. The engineering, procurement and construction management services are expected to run for 48 months.

► www.perucopper.com
 ► www.akerkvaerner.com

DSM: Bio-based Material Investment in China DSM Venturing, the corporate venturing unit of Royal DSM, announced that it has participated in a \$20 million financing round in Tianjin Green Bio-Science (China). The proceeds will be used to build China's largest manufacturing plant for Polyhydroxyalkanoates (PHA) in the Tianjin Economic Development Area (TEDA).

This investment brings the total number of current company participations of DSM Venturing to 20. Venturing forms an integral part of DSM's open innovation approach, focused on teaming up with innovative players all over the world. The company has earmarked up to €200 million for venturing investments until 2012. China is one of the core regions in the global investment strategy of DSM Venturing.

The plant's construction will commence in Q2 2008, and is expected to start production in early 2009. It will have an annual production capacity of 10,000 tons of PHA.

► www.dsm.com

Arkema to Double Production Capacity Arkema said it plans to double production capacity at its Leuna site, Germany, to 80,000 t/y by mid-2010. The company said the increase represents a €40 million investment. Following the expansion in 2005 of its production capacities in North America (+20,000 t/y) the doubling of capacity at the Shanghai plant, China, due to come on stream in the summer of 2008, and the 10% capacity increase at the Jarrie site, France, Arkema's global hydrogen peroxide production capacity will reach 440,000 t/y by mid-2010 when the Leuna expansion becomes operational. Arkema said it will then be the world's sole hydrogen peroxide producer with production plants each exceeding a 70,000 t/y capacity.

► www.arkema.com

Ineos Polyolefins Extends Grangemouth Unit Ineos Polyolefins has announced its intention to invest in random co-polymer technology on its liquid pool polypropylene (PP) unit at Grangemouth, Scotland. By linking ethylene supply from its crackers to the PP unit, random co-polymer grades with a wide range of melt flow rates will be produced commencing Q3 2008 for the blow moulding, packaging and medical sectors. In early 2007, Ineos Polyolefins had announced the 50kt/y debottleneck of its liquid pool polypropylene unit, raising its capacity to 285kt/y. This investment has now been completed.

► www.ineos.com

Albemarle Expands in China Albemarle Corporation, a supplier of antioxidants for polymers, lubricants, fuels and biofuels, has announced that its board of directors has approved a project to more than double the antioxidant production capacity of Shanghai Jinhai Albemarle Fine Chemicals, part of the "Jinhai Albemarle" manufacturing joint venture in which Albemarle gained a majority ownership stake last year. This strategic expansion will allow Jinhai Albemarle to maintain its market position in China. Jinhai Albemarle currently supplies antioxidants to many Chinese petrochemical companies from two integrated production sites in China.

► www.albemarle.com

Trailblazing — Wireless communication has become an everyday phenomenon in home and office IT environments. WLAN- and Bluetooth-enabled laptop computers as well as various other electronic appliances have followed on the heels of GSM standard mobile phones. But what do these applications mean for industrial use?

Tried and tested standards like WLAN and Bluetooth play a significant role in industrial applications, but more recently introduced variations on the wireless theme, e.g. the Wireless Hart protocol, give users new options to consider. Which potential benefits do the competing standards bring about? And how can extra requirements for wireless technology in hazardous areas be fulfilled?

For any industrial communications solution, the question arises as to where and how a new technology can operate cost-efficiently, i.e. bring about sufficient benefits to justify the necessary investment for a new implementation. In some cases, wireless radio is supposed to replace a cable-based network, and must directly compete with these established alternatives, but there are other applications in which wireless transmission actually gives users all-new tools to introduce completely new processes that were inconceivable in the past due to the limitations of electric line solutions.

One example for such applications is the use of portable operator terminals with wireless interfaces, which can considerably simplify maintenance and commissioning tasks. As a first step, it is therefore sensible to take a detailed look at typical routines in process plants, and identify potential application areas with a view to how and how much they may benefit from wireless technology.

Logistics

State-of-the-art logistics solutions depend on systems that acquire data on the flows of goods with the highest possible degree of precision, and preferably in the very instant when stock items are taken out or replenished. In the process industries, many raw materials and products are transported in containers such as drums, tanks, IBCs, etc. Most of these are marked with either barcodes or RFID (Radio Frequency Identifier) tags. Acquiring RFID tag information is obviously a model application for wireless technology. As of yet, however, most readers used for this purpose are handheld terminals with a cable that needlessly impedes their operation. Portable devices capable of both acquiring data and passing it on via radio to a central management system save time and costs, and increase data reliability due to exact and all but instant acquisition.

Beyond The Wire

New Trends for Industrial Communications



CAN YOU HEAR ME NOW? Typical environment for the use of wireless solutions in the process industry.



Usage of industrial notebooks for maintenance

RFIDs, which were first applied in the retail sector, continue to increase their foothold in the process industry. One key RFID advantage over barcodes is that smudged and stained labels can still be read from. Also, there are other convenient features which previous solutions could not provide, e.g. that data can be written to the tags more than once, or that it is possible to acquire several tags at the same time, etc.

Installation, Maintenance, Operating and Monitoring

Any activities having to do with operator or service staff access to a plant stand to benefit when personnel can use portable devices with a connection to MES (manufacturing execution system) and ERP (enterprise resource planning) servers, since that enables an optimization of typical production processes.

For example, maintenance instructions can be automatically dispatched, as all relevant information can be provided via radio to a portable device service engineers can carry with them in the field. Staff is then

able to inspect equipment as needed and, upon completion or even while they are taking care of a maintenance task, enter the results of the inspection, or repairs made, directly into the portable device. That data is then instantly available in a central database and can be utilized for documentation purposes or even to speed up billing.

Similar advantages apply to operating and monitoring tasks in industrial plants. Portable devices make it possible to read live measured values and therefore keep an eye on the actual state of the production plant on site. At the same time, operators in the field have access to ancillary information such as maintenance schedules, operating instructions, ATEX certificates, and much more. As a result, routine procedures can be modified to become considerably more efficient. Also, camera systems or sensors at measuring points somewhat farther away, e.g. within pump stations, can be integrated into the HMI concept at a low cost and can be readily displayed where needed thanks to radio transmission.

Live information about the current state of production equipment in a plant in as much detail as possible gives staff better means to anticipate imminent plant failures and to adjust maintenance intervals to actual needs.

Process Applications

Using wireless communication does away with the often complex and costly laying of cables. However, many process industry applications really require wireless field devices with an independent, onboard source of power. A number of promising approaches are based on consumption-optimized electronic circuits and on alternative sources of power using accumulators or solar cells, or on recovering energy from vibration, temperature fluctuations, etc. Initial field trials by process control system manufacturers with self-configuring meshed wireless networks have produced an availability rate of up to 99%, which is certainly a respectable result. In the chemical, petrochemical and pharmaceutical industries, however, typical processes almost without exception cannot tolerate any interruption or error, as any such occurrence might result in costly losses for the plant operator. Since uncompromised

availability of a production plant is one of the most important criteria here, it will likely take some more time before the wireless transmission of critical signals in control loops becomes common practice.

Asset Management

What can and should be done today, however, is a selective radio transmission of specific signals that are particularly hard to acquire any other way, or of non-critical sensor data used for purposes such as process optimization. While core process signals are absolutely needed to ensure proper control of a plant, other measured values are acquired only to be used for process improvements or preventive maintenance. For the time being, Hart communication is most commonly used to transmit such signals, or no sensors may be used at all. Recently, higher-level asset management is taking on increasing importance in the process industry. Live information about the current state of production equipment in a plant in as much detail as possible gives staff better means to anticipate imminent plant failures and to adjust maintenance intervals to actual needs. Wireless data transmission is an attractive option for this area of application. Part 2 will examine different types of wireless solutions and the many hazardous area requirements. CHEManager Europe issue 5/2008 will be out on April 25.

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Right Place, Right Time

First Hart 7 Products Expected This Year

The Hart of the Plant — The Hart Protocol is a simple communication protocol running on top of the 4-20 mA plant instrumentation and control wirings. Widely adopted by the process industries during the 1990s, this mixed mode protocol is present in the 24 million Hart devices installed in plants today — and their number is increasing by 2 million every year. Typically, Hart devices are smart pressure transmitters or positioner for valves.



Jean-Luc Griessmann
Hart Communication
Foundation Group

The latest specifications, Hart 7, were released in 2007, introducing the new Wireless Hart standard. This represents the first open and interoperable standard for wireless field communications in a process environment. This technology supports industry requirements for a simple, reliable and secure wireless communication for process plants and is fully backward compatible with existing Hart infrastructures. This article highlights important characteristics of the protocol, and how such a wireless mesh network could be deployed. First Hart 7 products are expected during this year.

The largest part in the new revision 7 of the Hart protocol is devoted to the optional Wireless Hart Field Communication. This represents two years of efforts from a specification team, composed by industry experts from major Hart equipment manufacturers and wireless technology provider companies like ABB, Adaptive Instruments, CrossbowTechnology, Dust Networks, ELPRO Technologies, Emerson Process Management, Endress+Hauser, Flowserve, Honeywell, MACTek, MTL, Omnex Control Systems, Pepperl+Fuchs, Phoenix Contact, Siemens, Smar, Yamatake and Yokogawa.

Hart 7

Not intended to replace wired Hart

Wireless Hart is not intended to replace the classic wired Hart; rather, it is to extend the protocol to new application areas where wiring would be technically not possible or too expensive.

The new protocol extension is designed to coexist with the 4-20mA technology: A control system can use the 4-20mA signal for control and in addition the Wireless Hart Information



CABLE SPAGHETTI Wireless Hart makes servings of this kind a thing of the past.

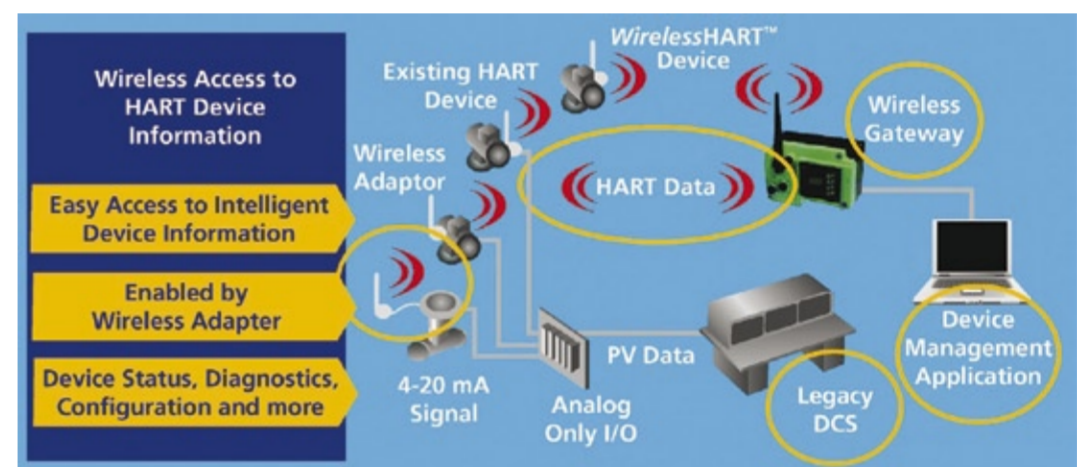
(Photo by Stig Inge/Photocase)

Extending the plant condition monitoring to the assets subject to mechanical failure can help to increase the plant availability and reduce the unplanned down time.

Mesh networks, such as the Internet, organize themselves making them more reliable by

Attribute	Description
Radio standard	IEEE 802.15.4-2006 @ 250kbps
Frequency Band	2.4GHz
Frequency Management	Frequency hopping on a per packet basis
Distance	Up to 200m line-of-sight
Power	Line Powered Solar Powered Battery Powered 1-10 years depending on implementation
Topologies	Mesh Star Combined Star & Mesh
Number of devices	Limit not specified. Number of devices will depend on the application requirements and any gateway constraints
Based on Industrial Standards	HART - IEC 61158 EDDL - IEC 61804-3 Radio & MAC - IEEE 802.15.4(TM)-2006

Wireless Hart technical specifications.



changing the route to a destination when the current one is disturbed by an obstacle or local Interferences. While there are several routes to a given destination, these are redundant. As the route can change, the occupied radio channels can change too in Wireless Hart (frequency hopping). Lists of free channels are continuously maintained, helping to deliver high reliability in challenging radio environments. Communication retries always occur on new channels. This agility in finding clear channels and the short channel occupation time (10 ms) positively influence the coexistence with other radio networks in the license free 2.4-GHz-ISM-Band.

All these characteristics, combined with refined security procedures and AES-128 encryption help to establish a very robust and secure field communication network. One of the conditions for building such self-organizing networks is that all devices in the network are able to route means able to receive, to send and to forward radio packets to other network participants.

The Network Manager

A Wireless Hart Network consists of various Wireless Hart field devices, at least one Wireless Hart Gateway and a Wireless Hart network manager. These components are communicating together via Radio in a mesh network, a bi-directional communication.

The network manager is an application controlling and monitoring the mesh network. Following functions are supported:

- Formation of the mesh network
- Integration of new participants in the mesh
- Definition of the communication schedule for the communication between all the network devices.

Hart
The Hart protocol specifications are managed by the Hart Communication Foundation, which supported by more than 200 international member companies.

- Definition of redundant routes
- Monitoring the network health

Given the mesh's structure, the network manager can reside anywhere in the plant network, such as in the gateway or in the system. There is one network manager per mesh network.

The field devices are simply executing what commands given by the network manager. Additionally, they continuously inform the network manager about other devices to which they have radio contact.

The network manager keeps the overview of the possible routes and defines the route to destination. The manager also defines when and how often a participating device should communicate with whom. Because sending via radio is energy consuming, the communication scheduling is made with this aspect in consideration.

Locating all of these functions in the network manager reduces the complexity in the field devices, making implementations easier and makes the responsiveness in the network predictable. Setting priorities in communications remains a centralized function in the mesh.

Compatibility with Hart 5 and 6

The Wireless Hart application layer is still based on Hart commands. Some commands from Hart 5 and 6 were optimized for a better use of the communication bandwidth, and this has also a direct influence on the battery life of battery powered devices and new Hart commands specific to wireless configuration and operation

was added. Forward/backward compatibility rules of Hart apply for Hart 7 as well as for Hart 5 and 6.

Because Wireless Hart is based on Hart commands, applications designed for Hart can be upgraded for operating Wireless Hart devices. This can often be done by simply loading the new device description (EDD) for the new Wireless Hart device.

Upgrading Options

In the Hart 7 specifications specified, Wireless Hart adapters will be able to upgrade existing or installed Hart 5 and 6 devices to the wireless operation. Such adapters will be mounted on the Hart 5 and 6-Field devices or wired near to them; some will be able to power the field device over their integrated battery or by the 4-20mA loop. They act like a Hart master and read cyclically the process values, status information then forward it over radio. From the host point of view, the Wireless Hart adapter acts like a Hart 7 slave.

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PMI Rigid Foam Materials

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Building Resistance—Sandwich constructions are generally composed out of thin, stiff and rigid skins and a thick, light core that are tightly bonded to one another by adhesive layers. At low weight, they are substantially more bending-resistant and more rigid than monolithic constructions.



Dr. Jonas Scherble is responsible for Rohacell research and development at Evonik Röhm.

But it is only possible, as a rule, to attain a high performance level if the components that are used, namely the skins made of reinforced fibers and adhesive resins and the core materials, meet high requirements. Ideally, core materials should be light, stiff and rigid and be easy to process or shape to precision. Since the adhesive resins are cured under high pressure for several hours at temperatures of up to 200 °C, the core material must be able to withstand these conditions.

PMI foam is exceptionally easy to saw, grind and mill with great precision. At temperatures above 200 °C, the material becomes thermoelastic and can be formed into complex geometries.

Customizing The Cell Size

PMI foam can be processed in the wet process and with prepregs with all conventional resins. It is particularly suited for the economical resin infusion process because of its 100% closed cells. In these processes, low-viscosity resins injected under pressure impregnate the fabric, which is applied dry, and also fill the top cell layers of the foam that are opened by machining. The surface resin absorption for Rohacell WF is approximately 500g/m². By using the fine-cell grades Rohacell Rist and Rohacell Rima, which were newly developed in 2005, this number can be reduced to 250g/m² and below 50g/m², respectively. Figure 1 shows the belly panel of the Gulfstream G 150 aircraft made by Israel Aircraft, which is designed as a sandwich with a Rohacell core.

From Rigid Foam to Design Solution

The Rohacell product line offers excellent possibilities for the development of demanding design solutions.

ments, but particularly in the aerospace industry. The Rohacell product line has been certified according to EN 9100 since March 2007 and is an approved supplier of the space and aviation industry. All processing steps, ranging from the raw materials to polymerization to finished foam sheet or packaged foam core, are documented in conformity with EN 9100. The environmental management system is certified according to EN 14001. The first specification of Rohacell for an aeronautical application was written immediately after the start of production in 1972. Today, approximately 200 customer specifications guarantee an individually customized product profile.

Shapes

The cores for the carbon fiber reinforced plastic (CFRP) bulkhead, which seals the passenger cabin of the Airbus A340-60 to the fuselage structure, represent one example of Shapes production. The cabin overpressure subjects the round bulkhead to high stresses, requiring it to be reinforced by radially arranged profiles, called hat-stringers. A Rohacell core with precise geometry fills the trapezoidal cross section of the stringer. Manufacture of the cores starts with

the milling of flat strips with profiled sides and ends. The strips are cold-bent into the radius of the bulkhead and permanently formed by thermal treatment. After a final inspection of weight and geometry, the stringers are individually wrapped and packaged as a complete set for one bulkhead. Careful quality management guarantees conformity with cores that the customer had approved in first article inspection before the start of series production.

Finite Element Analysis

A very interesting development also occurred in regard to the use of hat-stringers as a reinforcing element of CFRP sheets. The problem in this case was to minimize the total weight of the structure for a predefined buckling load on the sheets in the direction of the stringers. As design alternatives, stringers with a Rohacell core were compared to hollow stringers. Internal FE analysis showed that the strength of a construction having a core should be about 16% higher than that of the hollow variant. This result was confirmed by experiments on corresponding prototypes. The somewhat lower stiffness and buckling load observed in the experimental results was due to imperfections in the pro-

otype in comparison to the model. These results are consistent with earlier experiments on similar constructions. Using Rohacell as a manufacturing aid thus makes it possible to save weight by including the core in the calculation of the structure and designing the CFRP skins correspondingly thinner. In comparing hollow cores with a filled core, it is possible to approximately compensate for the weight disadvantage represented by the core with correspondingly thinner skins. The production of stringers with a rigid foam core is much less elaborate, however, and more economical.

Component design is based on a criterion that describes the material failure as a function of combined stresses pressure, tension and shear in terms of an ellipsoid in tension space using three independent parameters. As part of a joint research project with the German Institute for Polymers (DKI) in Darmstadt, Germany, a 3D-failure-criterion for PMI foam materials was developed and experimentally confirmed through combined tension/shear and pressure/shear tests. The criterion describes the failure behavior more exactly than potential bodies and thus permits component designs featuring lower knock-down factors and there-

fore lower weight. An independent study by Airbus confirmed the suitability of the criterion for the design of CFRP sandwich sheets. It is easy to implement in CAE software and is used internally for numerical calculations of customer-specific component solutions.

Summary

Rigid foam materials based on PMI offer excellent properties for the economical manufacture of high-performance sandwich constructions with high durability. With its production of standard parts and prototypes in the Shapes unit, extensive possibilities for processing experiments in the STC and the possibility of in-house FE analysis of components, Rohacell jointly develops optimum solutions with the customer in a short time.

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One of the two Rohacell cores. b) Assembled Gulfstream G 150 belly panel.

High Performance Level

Evonik produces polymethacrylimide foam (PMI) in densities ranging from 30 to 200 kg/m³ and sells it in the form of sheets and finished molded parts under the trade name Rohacell. Grades with a customized property profile are available, depending on the market segment and application. Because of their excellent property profile, PMI rigid foam materials generally offer a whole series of advantages to the designer, production engineer and user. They have very high specific mechanical properties that, even at higher continuous working temperatures such as 80 °C, are nearly equal to the property profile at room temperature. Particular grades such as Rohacell XT achieve thermostabilities at temperatures in excess of 250 °C and can be processed at less than 2% compressive strain at temperatures above 190 °C and pressures above 0.7 MPa. The foam core supports the entire surface of the skins and provides for smooth and homogenous surfaces and good consolidation of the sandwich in comparison to honeycomb structures.

The Rohacell Sandwich Technology Center (STC) has the capability of producing sandwich prototypes through prepreg processing, lamination, autoclave techniques and modern resin injection methods like RTM, VARTM and SCRIMP. Appropriate process parameters for all of the above processes can be determined if necessary. In addition, the STC offers extensive possibilities for the thermal forming of PMI foam. Besides providing process optimization for customers, the center can also produce in small series.

The Shapes unit, which was set up in 2003, manufactures particularly complex core geometries in series and as prototypes. It has 4-axis and 5-axis milling machines and equipment for thermoforming large parts and for thermal treatment of foams. It can support and hasten all development work with finite element (FE) calculations (software package ANSYS).

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Fabrication of glasslined vessels and components

Resistant — Glasslined vessels, accessories and pipings are frequently used in chemical and pharmaceutical plants because of their chemical and physical properties. The excellent chemical resistance of glass to acid, basic and neutral organics allows a wide range of applications.

The very smooth surface of glass (Ra 0.05) facilitates the cleaning of the chemical systems. The hardness of the glass surface (600 Vickers) is a good protection against abrasive mediums. Compared to plastic linings, the allowable working conditions of glasslined equipment are greater, for example regarding pressure (-1/+25 bar) as well as temperature (-60/+250°C). The absolute impermeability of the glasslining gives great advantages for multi-purpose plants compared to the permeable plastic linings.

Compared to pure glass, glasslined steel is much more resistant to mechanical and thermal stress due to the resistance of the steel wall. The high quality of this compound material is the result of many years of experience and specific know-how regarding to glass composition and application techniques, materials selection and construction details, as well as firing technology.



Fig. 1: Warm extrusion of a vessel nozzle

Carrier Construction

Steel components, built for glasslining, have to be specifically designed and manufactured.

Uniform thicknesses must be realised to avoid unhomogeneous heating up and cooling down during firing process of glasslined components. Oversized wall thicknesses of ves-

sels are purposely made, not to withstand the final working conditions, but to pass the several heat treatments of over 800°C needed without causing deformations. The selection raw materials are selected under consideration of the chemical composition for controlled hydrogen diffusion and best adherence of the lining on the support steel base. Welding

procedures and welding specifications also have to be considered. Items to be glass lined must have a minimum radius and an absolutely smooth surface, all nozzles are extruded at temperature to avoid stress and not disturb the good formation of the lining (fig. 1).

After classical manufacturing, assembly and welding, all welds have to be grinded so that

the surface to be lined is absolutely even; imperfections in the steel surface must be smoothed to avoid any kind of step. Conditions for a perfect glass lining are an absolutely perfect steel fabrication, including welds without defect. The final steel construction has to be normalized at 920°C. After this treatment and a possible Hydro test, the whole apparatus is sand blasted once to clean and prepare the surfaces. A sanded surface gives a certain roughness and improves the mechanical adherence of the glass. Of course the steel construction is constantly submitted to quality controls:

- Material certificates as well as control analysis.
- Survey of welding preparation, welding data and operations.
- Nondestructive testing by LPT, US, or RX.

Glass Production

Each manufacturer has his own glass recipe and most of them produce their own glass frits. The process of glass production is as follows:

After mixing of the raw materials, they are melted in a furnace at 1500°C. The frit is finally obtained by quenching in cold water.

By milling the frit in a ceramic ball mill, including additional set up salts and water, after a final filtration, a slurry ready to be used for pouring out or spraying is obtained.

Constant quality checks are here also absolutely necessary:

- Control of raw materials by certificates and test smelting
- Examination of fluidity and expansion for each batch
- Production of test plates to check mechanical and thermal limits
- Checking viscosity, grain size and distribution of the slurry.

Glass Lining

The slurry and the steel parts go into the enamelling area to be worked on. The glass lining consists of several applications and firing operations during which the whole layer always completely fuses. The first layers (applied 1 to 2 times) are made of ground enamel. This enamel is specifically prepared to ensure the requested adherence on the steel; firstly on a mechanical basis: due to the roughness of the steel support, secondly on a chemical basis: due to the oxide film built up during firing. The composition of the ground enamel will determine the admissible temperature difference (ΔT) due to his buffer function



Fig. 2: Firing of pipes



Fig. 3: Glass control of a column section

between steel and cover coating. Since the ground enamel is chemically less resistant than the cover coating, it is very important to limit its thickness at 0.4-0.5 mm.

The next layers (5 to 8 cycles) are made of cover enamel. This is the real acid/alkali resistant enamel. The total thickness according to usual standards should be 1.0 to 2.2 mm for vessels and 0.8 to 2.0 mm for piping. The technical conditions are precisely given in DIN 28063 for vessels and accessories, in DIN 2876 for piping. Appropriate technologies and extended know-how are necessary to match the high level of quality requested for these specific products.

Important Working and Control Steps

The most important working and quality control steps are:

- Application of slurry by spraying on (for easy reachable surfaces) or pouring out (in hard to reach areas)
- Complete drying of the applied layer
- Wiping off surplus, and finalizing the edges before firing
- Loading the components on heat resistant firing supports
- Firing the applied layer at approx. 900°C for ground coats and approx. 800°C for cover enamel, using specific firing parameters adjusted to the type and size of the pieces (fig. 2).

- Cooling down to ambient temperature (windless or in closed cabin)
- Intermediate controls after each firing
- Visual checks (for inclusions, cracks, firing aspect, surface image) as well as thickness measurements on different areas of the pieces (fig. 3).
- Corrections of unacceptable defaults on the surface after each firing: scale, fire clay and other inclusions have to be removed, steps in the thickness of the lining have to be smoothed out before the next application.
- Checking the deformations after each layer allows a correction from one firing to the next and improves final result.
- Above a thickness of 1.0mm (0.8 for pipings) a spark testing will be done at 20kV DC. This process will be repeated as many times as necessary to obtain a product fulfilling the requested standards. Produced carefully and with adequate competences glass lined articles are safe and high quality products. The end user can match all needs regarding chemical, mechanical, abrasion, temperature and pressure requirements.

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At The Crossroads

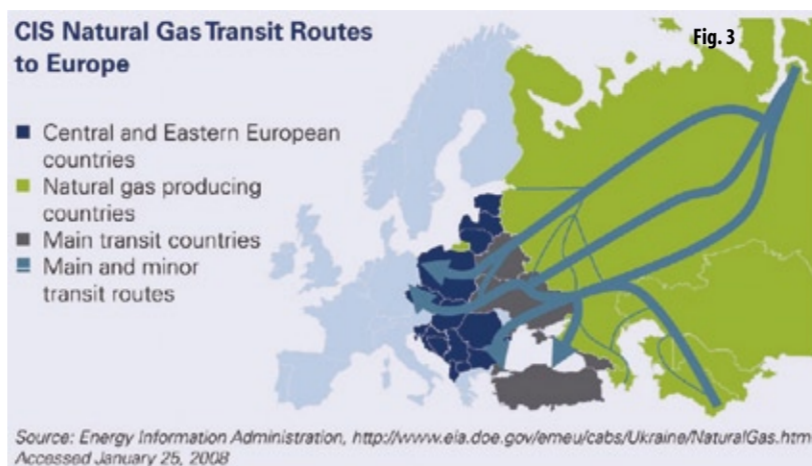
The CEE Region and the Natural Gas Security of Supply of the EU

Increasing Dependency — Europe is becoming increasingly dependent on imported hydrocarbons. If the current energy consumption trends in Europe continue, the EU's energy import dependence will jump from 50% of total EU energy consumption today to 65% in 2030. Reliance on natural gas importance is expected to increase from 57% to 84% by 2030. This increase is not only true for natural gas consumption but as well for investments opportunities in the energy sector of the CEE region.



stitute in the short run; however, natural gas reserves will cover demand only for a limited finite period. Therefore, the security of supply of natural gas has to be ensured and, in the meantime the proportion of electricity generated from renewable energy sources has to be steadily increased.

As long as there are sufficient reserves, natural gas has three important uses in contributing to a sustain-



Urals region containing over 70% of the total Russian natural gas reserves. The location of these natural gas reserves results in unique technical and geographic considerations. The majority of these gas reserves are located in remote areas that suffer from extreme weather and are over 4,000 km from the CEE region thus Russian natural gas must be transported long distances to reach the European markets.

Besides the Russian gas resources, Turkmenistan, Azerbaijan, Kazakhstan and Uzbekistan are the second most important oriental gas export countries for Europe; however they all are heavily dependent on Russia concerning exports since most coun-

tries lack alternative supply routes other than those through Russia.

Major investments in the natural gas production and transmission network of these countries are being undertaken, resulting in natural gas production in the CIS becoming increasingly efficient and growing rapidly in recent years.

Transit Routes

These factors provide an opportunity for the CEE countries to satisfy their own natural gas demand from the CIS countries by strengthening their inter-connector capacities towards them. This acts as an incentive for the western part of the EU to join these

negotiations by requesting transit capacities through the CEE region by which they may fulfill their own increasing demand.

Looking at the map of the main transit routes, we have to consider that most of the existing cross border transmission routes from the CIS countries to the CEE region and toward Europe have been built during the Soviet era (fig. 3). Due to the increasing production of the CIS countries and the strong position of Russia there is a need to develop further transmission routes. Presently there is a lack of internal and cross border transmission routes alike, which creates major bottlenecks and inefficiencies.

Some of the planned projects are considering connections to consumers through transit countries other than Russia or Ukraine. There are projects which plan to connect Asia with natural gas, while others are planned that would connect Russian and the other CIS countries to European markets.

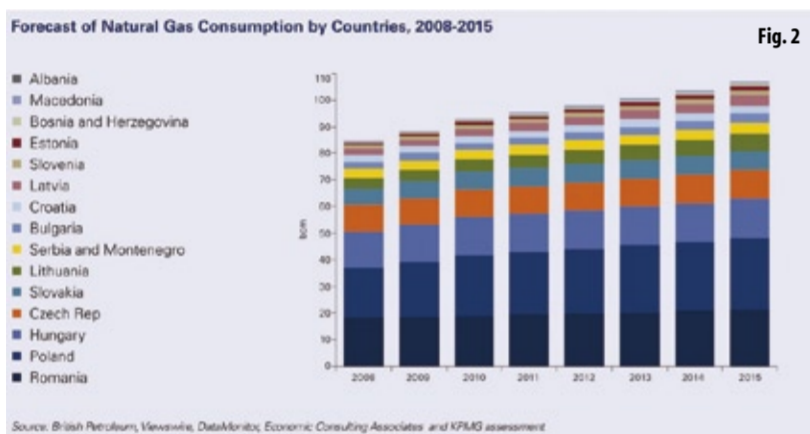
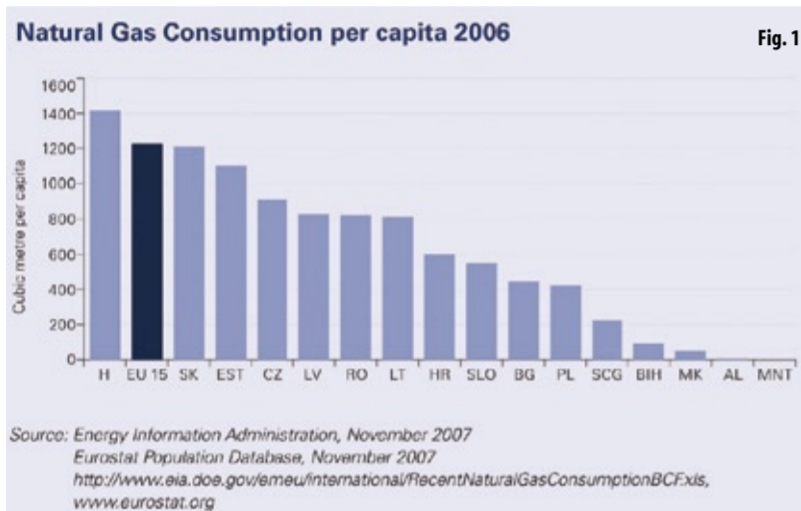
It Is Worth Investing in the CEE Region?

This environment offers both the incumbent market players and new entrants the opportunity to capitalize on the changing market conditions and the geographic comparative advantage of the region for the benefit of industrial, commercial and

individual consumers. It is also up to the different regulatory bodies and governments to provide such conditions that will foster the emergence of an attractive but competitive unified natural gas market.

There are lively debates about the future of natural gas, but since it has no substitute under the key constraint of CO₂ emission reduction, the CEE and all of Europe will have to live with natural gas for the foreseeable future.

Since neither the CEE nor Western Europe is able to cover their demand from domestic reserves, an increasingly significant portion of the supply will come from the CIS region. Since the amount of the CIS's countries natural gas reserves is finite, significant capital investments in the CEE's natural gas transportation, storage and interconnector infrastructure are required now to secure the natural gas flow from the CIS region towards the CEE, before that flow finds its next best alternatives to other regions, such as India and China.



A significant portion of the natural gas consumption is transited through the Central and Eastern European region originating in the Commonwealth of Independent States (CIS) making large infrastructure investments inevitable to be able to support this enormous demand increase.

The situation in the CEE shows a very similar pattern as Western Europe due to the fact that many of the same factors that are impacting the demand growth for natural gas in the former EU 15 are also present in the CEE region (fig.1). The increasing consumption of natural gas in Europe and also in the CEE region is mainly triggered by the shift of fuel in electricity generation from coal to natural gas as a result of increasing concern about climate change.

The CEE countries are expected to significantly increase the amount of renewable generation but this will still only amount to a relatively small proportion compared to the total demand. In addition, most of the countries have public support for continued or expansion of nuclear generation with over 9,000 MW of capacity either planned or proposed in the region, even though the implementation of nuclear generation has major financial implications.

Although the fuel costs of nuclear generation are significantly lower than in case of natural gas generation, the costs of nuclear generation are heavy burdens in countries where facilities are ultimately owned by the government; thus such investments are dependent on government support. Consequently, a more significant shift towards natural gas generation is expected in the CEE region (fig 2.).

Neither electricity nor its primary fuel of natural gas has a real sub-

able future: It is a relatively clean primary energy source; an important fuel source for households; and natural gas fired power plants provide flexible and reliable generating capacity to support the increasing growth of electricity demand in the region.

Gas fuelled electricity generation is expected to grow by 73%, representing 53% of the total gas demand increase between 2005 and 2020. Electricity generation – reaching approximately 130,000 MW coming from gas generation – will remain one of the main drivers of the EU's natural demand growth.

Within the EU, natural gas is expected to represent most of the energy consumption increase (80%). Even when considering the large natural gas reserves of Norway, the Netherlands and the UK, the EU domestic sources are overall being depleted and discoveries of large new reserves are not expected. Although Western European countries had an annual production level of 300 billion m³ (bcm) in 2005 and proven reserves of approximately 4,700–5,700 bcm; the region is still a net importer of natural gas and thus only limited supplies are available for export to the CEE region.

Natural Gas Import Sources

Russia, the most important natural gas source of Europe has some of the most significant natural gas reserves in the world, totaling 47.65 trillion m³ (tcm) of proven reserves and 612.1 bcm of production in 2006 – accounting for 26.3% of the total world reserves and 21.3% of worldwide production.

The primary Russian natural gas fields are located in the Urals and Shelf Districts of Russia, with the

CEE Natural Gas Outlook 2008



KPMG in CEE's Energy and Utilities Center of Excellence, based in Budapest, has published its Central and Eastern European Natural Gas Outlook 2008, highlighting the most important trends affecting the region's natural gas sector. The study is available at kpmg.hu

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The Beat Goes On

Oil and Gas M&A Undeterred by Credit Crunch

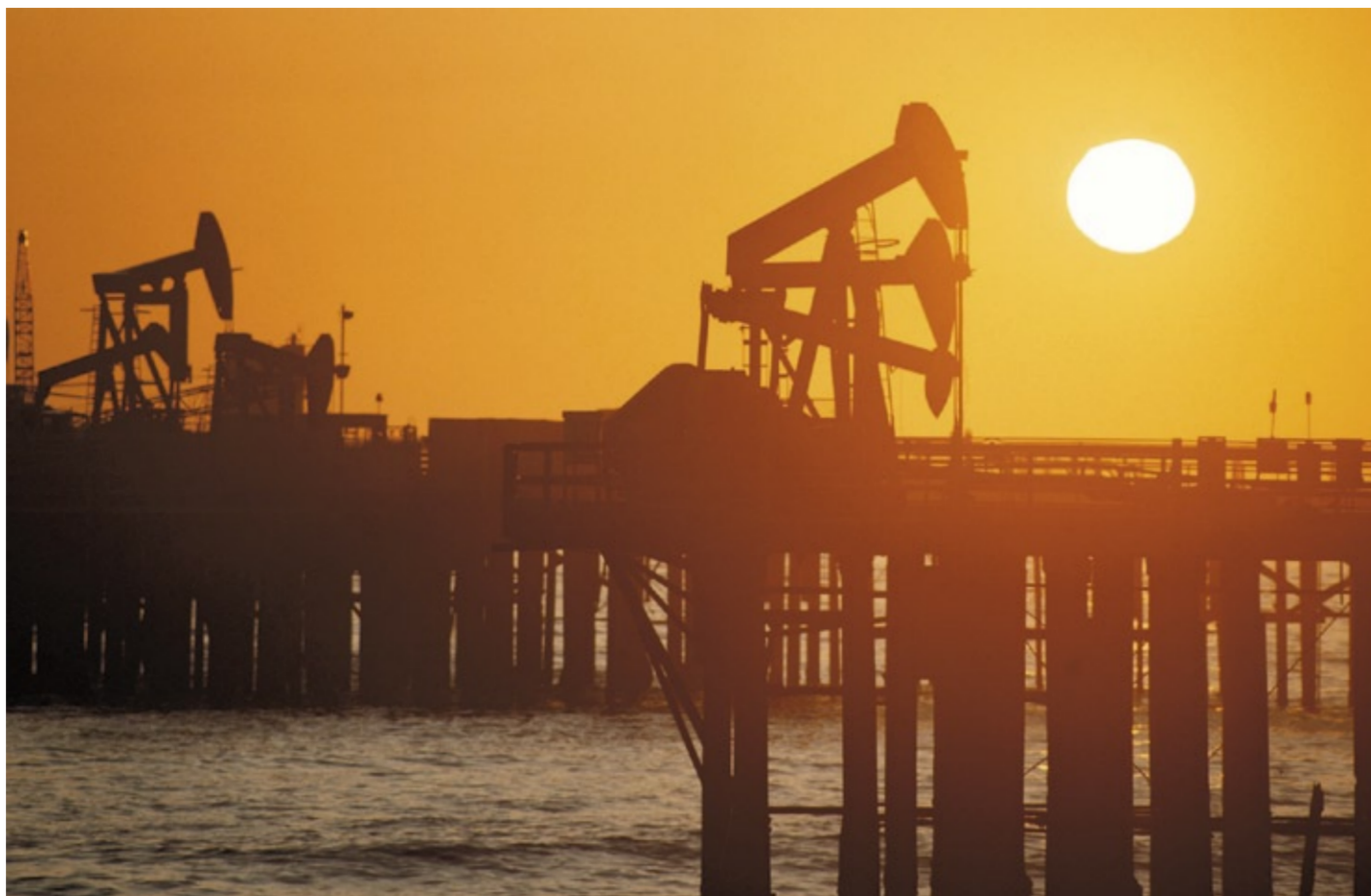
Holding On — Merger and acquisition (M&A) levels in the oil and gas industry held up throughout 2007 despite the impact of the credit crunch, according to a new analysis conducted by PricewaterhouseCoopers. The review "O&G Deals" shows deal totals edging up slightly, from \$291.1 billion to \$292.2 billion year on year.

There was no clear evidence of a decline in oil and gas deal activity in the second half of the year as the credit crunch broke. Indeed, the number of final quarter deals in 2007 was 7% up on the final quarter of 2006. What is clear, though, is the changing dynamics of M&A activity within the sector. Oilfield service deals continue to boom reflecting growth in demand and utilization rates for rigs as well as the need for service companies to scale-up globally in a consolidating market.

The total value of deals in the oil field services sector jumped 165% from \$25.4 billion to \$67.3 billion in 2007. The oil services sector is now a key motor of M&A activity in the wider oil and gas industry, accounting for nearly a quarter (23%) of the value of all deals compared to just 4% in 2005. The trend of consolidation in the sector looks set to continue in 2008.

The majors continue to be relative M&A absentees with the dominance of the national oil companies (NOCs) constraining the use of M&A as a reserve replacement strategy. There was a lull in activity that in previous years had seen Russian, Chinese and Indian NOCs becoming major competitors for assets outside their home territory.

Instead, it was oilfield services and the downstream sectors that fuelled M&A activity. Aggregate deal value in both sectors more than doubled, in downstream from \$28 billion in 2006 to \$61.7 billion in 2007 and, even more strongly, from \$25.4 billion to \$67.3 billion



in the services sector. Much of the \$33.6 billion increase in downstream deal value was accounted for by the largest O&G deal of 2007 – Dutch chemicals group Basell's leveraged \$20 billion buy-out of Lyondell.

PricewaterhouseCoopers anticipates that highly leveraged deals will become more difficult in the sector as the credit crunch takes effect. However, while the wider financial and economic environment will be less predictable, the report points to a range of factors that will continue to drive deal activity:

- Corporate players will be mindful of the pressure to replace reserves and the structural rationale for consolidation.
- National oil companies will continue to use their strength to look for international investment opportunities.
- Middle Eastern investors will remain active deal makers.
- Supply constraints, geopolitical considerations and climate change concerns will necessitate continual re-evaluation of asset portfolios.

Key Regional Markets

Europe – Total O&G deal value in Europe could not rival that of 2006 when the overall total was boosted by the StatoilHydro \$32.2 billion upstream merger. Setting this single deal aside, remaining upstream deal value was slightly up and the value of downstream deals more than doubled, from \$3.7 billion in 2006 to \$8.4 billion in 2007, to account for the biggest share of total European O&G deal value.

International – International deals, involving either international groups of investors or assets that are spread across territories, were up across the board in 2007, with the exception of the upstream. Total value rose 269% from \$20.5 billion in 2006 to \$75.8 billion in 2007. Deal numbers were up 42% from 50 to 71 and average deal value was up 160% from \$400 million to \$1.1 billion. International deals took four of the top ten deals in 2007, with bids for Lyondell, Global-SantaFe, Huntsman and IPSCO totalling US\$54.4bn. In the 2006 top ten, in contrast, there was just one international deal, worth US\$5.3bn.

North America – O&G deal volume in North America was down 21%, from \$164.7 billion in 2006 to \$129.7 billion in 2007. Much of the difference was accounted for by the presence of the \$32.4 billion Kinder Morgan buyout in the 2006 total. Setting this aside, deal numbers and value were broadly level year-on-year. There were 31 deals in 2007 worth \$1 billion or above, for example, compared to 32 in 2006. Moves by foreign buyers for North American assets were a common theme in 2007

including noteworthy moves by a number of European buyers. **Russia and the Commonwealth of Independent States** – Oil and

gas M&A activity was driven by the continuing restructuring of the Russian energy industry. Total deal value was up 19%, from

\$30.1 billion in 2006 to \$35.7 billion in 2007, in the Russian Federation and neighbouring CIS states.

The number of deals was relatively unchanged, 41 deals in 2007 compared to 42 the previous year. This pushed average individual deal value up 21% and the \$870 million deal size was three to four times the average \$236 million recorded in other geographic regions. Not surprisingly, the vast majority, 83%, of the region's O&G deal value was in the upstream sector. This was more than double the 40% upstream share worldwide outside the region.

Asia Pacific – Total 2007 deal value in the Asia Pacific region maintained its 2006 level with a total \$16.2 billion of deal activity. The total continues to fall short of the \$19.6 billion transacted in 2005. Deal numbers fell 28% from 105 to 76 but this pushed average size up 38% to \$213 million.

Australia provided the focus for the largest number of deals within the region but South Korea was the location for the biggest share of total transaction value with a string of deals for downstream refining, petrochemical and retail-

ing assets. The period ahead will see a major burst of deal activity in Australia, as the state government of South Australia removes an ownership cap on Santos, Australia's third-largest oil and gas group. With substantial reserves and a strong international presence, the company sees this as a growth opportunity, allowing them to offer scrip for acquisitions. It has also been speculated that the move will lead to a multibillion dollar auction.

► www.pwc.com

FACTS AND NUMBERS

\$3.7 billion

was the value of downstream sales in European oil and gas in 2006

\$8.4 billion

was the same value in 2007

165%

is how much the value of oil-field sector deals was up in 2007 over 2006

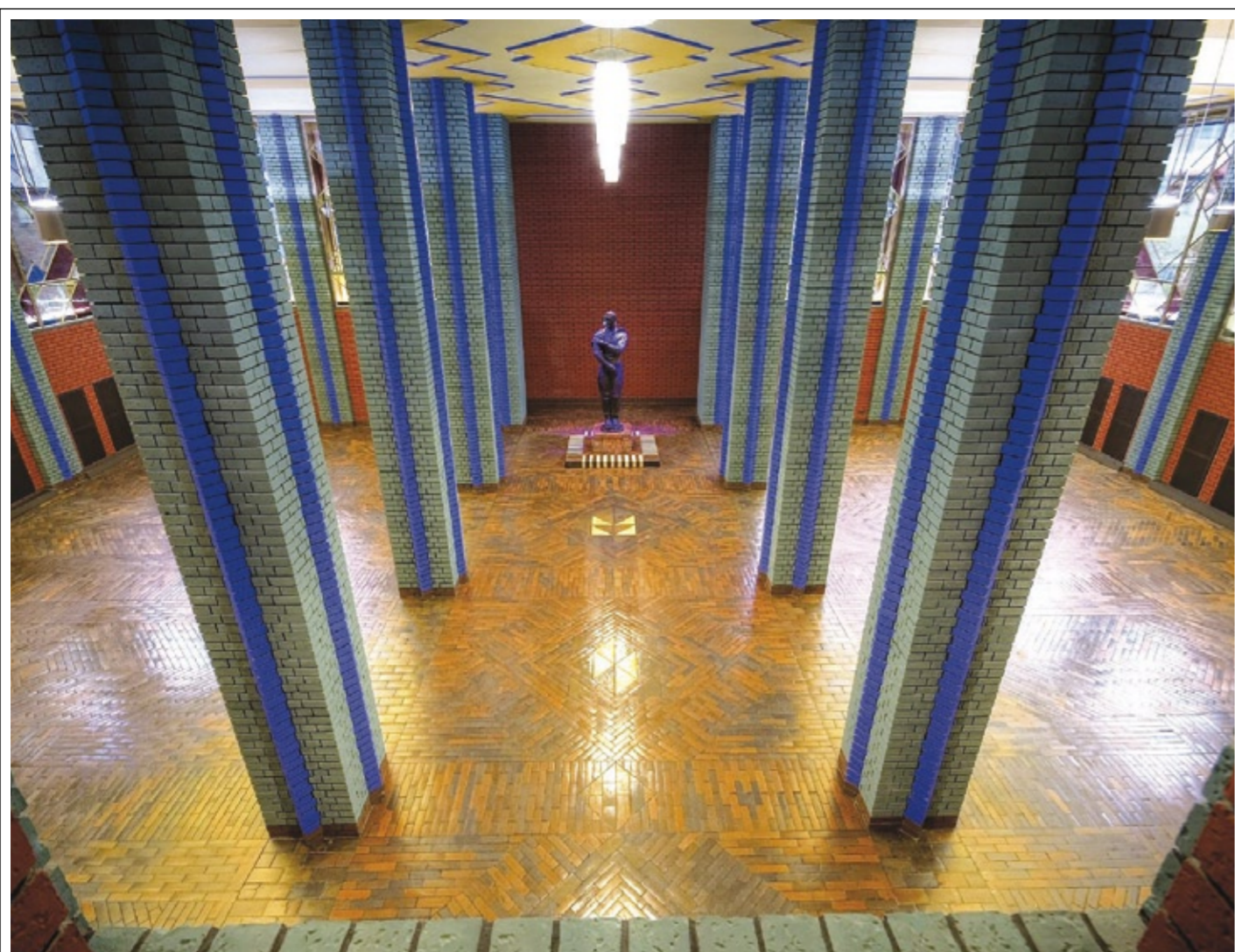


First Cargo of LNG Arrives in U.S. The first cargo of liquefied natural gas (LNG) from the Snøhvit field, outside Hammerfest, Norway, arrived in the U.S., the Norwegian oil and gas company StatoilHydro announced. This shipment of Snøhvit liquefied natural gas is the first delivery of gas from Europe to the world's largest energy market. The liquefied natural gas carrier Arctic Discoverer docked at the Cove Point gas import terminal in Maryland, south of Washington DC, at the end of February after a voyage of 12 days across the Atlantic.

www.statoilhydro.com



The Barcelona® Chair by Knoll, Inc.



Shiny And New The landmarked Peter Behrens building at Industriepark Höchst – a symbol of expressionist industrial architecture – has been restored to its original condition thanks to extensive renovations. The building, which was built in 1924, was initially housed the Hoechst AG's technical administration offices. Now the building can be used as for a variety of events and exhibitions.

Photo by VG Bild-Kunst, Bonn 2008.

www.industriepark-hoechst.com

The best testimony to the innovative power of Merck, its reliability and close understanding of local and global markets is the sheer diversity of its products. The Merck portfolio currently encompasses more than 15,000 chemicals and reagents, active ingredients, test kits and analytical systems. Every day, new products join the fold, the result

of purposeful research projects, specifically tailored to the needs of the customer. Naturally, each project meets Merck's own high standards in terms of ultimate quality and reliability – which spells peace of mind for you and more time to concentrate on your work.

www.merck-chemicals.com

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IFRA Standards Become the Norm in Asia

Members of the Association of South East Asian Nations (ASEAN) have implemented a new cosmetic directive which includes adherence to the International Fragrance Association (IFRA) Code of Practice for the manufacture and handling of fragrance materials. The directive, which entered into force on Jan. 1, must be implemented by all 10 ASEAN member countries: Brunei Darussalam, Cambodia, Indonesia, Laos, Malay-

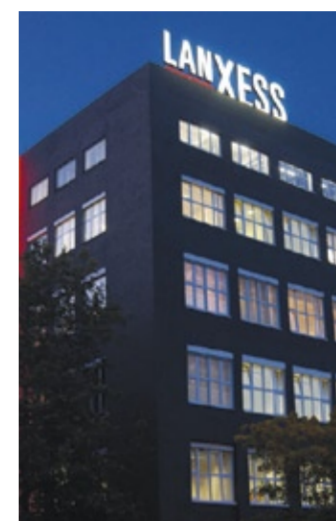


sia, Myanmar, Philippines, Singapore, Thailand and Vietnam. The directive is based largely on the European Cosmetics Directive and includes safety guidelines on the products and product information file guidelines. Both these guidelines stipulate that cosmetic companies have a certificate of compliance to the IFRA guidelines in their files for each fragrance they use.

www.ifra.org

Lanxess Ahead Of Target

Following reports of higher-than-expected earnings in 2007, Lanxess officials indicate they anticipate meeting their 2009 targets one year earlier. For its 2007 year-end earnings, the specialty chemicals company announced it achieved a 5% increase in adjusted sales growth and decreased its net financial debt from €511 million to €460 million. The company also reported a 6.5% increase in EBITA pre exceptionals totaling €719 million compared to €675 million in 2006. Officials indicate they expect to achieve additional growth in 2008 due



to the acquisition of a majority interest in Brazilian company Petroflex – a deal expected to be completed by the second quarter of this fiscal year. Despite an economic slowdown in the U.S., Lanxess officials also forecast growth in Asia, Latin America and Eastern Europe will help them to further achieve this growth. In addition, in 2008, the company said it expects to spend between €330 million and €350 million to replace or expand its facilities.

www.lanxess.com

Bioreliance Works With Trackwise

Sparta Systems has announced that Bioreliance, a contract services organization for the biopharmaceutical and pharmaceutical industries, deployed Trackwise to handle management activities. As a result of the divestiture of Bioreliance from

Invitrogen, the current Invitrogen system, used for deviations, non-conformance reports, corrective and preventative actions and audits, will be replaced by a discrete, Bioreliance-developed system named Trackwise, to become the global Bioreliance

quality management system. It is anticipated that this will help to reduce the validation burden and implementation time.

www.sparta-systems.com
www.bioreliance.com

Pfizer Expects Boost in 2008 Outlook, Phase III Drugs

Pfizer analysts report they expect an increase in the pharmaceutical company's Phase III pipeline along with a boost in 2008 revenue ranging from \$47 to \$49 billion. Chairman and CEO Jeff Kindler said Pfizer anticipates growing the total number of Phase III programs

by 50 to 75% by the end of 2009 – currently there are 16 medicines in this stage. To further increase its global footprint, Pfizer also said it plans to expand its presence in emerging markets such as Latin America and Asia while continuously focusing on delivering revenue

from existing patent-protected products. In addition, Kindler indicates they are accelerating clinical development on 20 programs in disease areas such as arthritis, cancer, pain and diabetes.

www.pfizer.com

Huntsman to Increase MDI Manufacture Capacity

Huntsman Corporation has commenced design and feasibility studies to increase its global capacity for the manufacture of methylene diphenyl diisocyanate (MDI) through investment in a new, world scale MDI

plant at its site in Rozenburg, the Netherlands. Feasibility studies, including preliminary engineering for the new unit, are now underway and a final investment decision is expected during 2008, with the new

400,000 mt capacity unit coming on-stream by 2011. The final plan may also incorporate the closure of older, less efficient capacity in Europe.

www.huntsman.com

Cerep Expands North American Laboratories

Cerep has announced plans to extend its facilities in Redmond, Wash. (U.S.), through the lease of an additional 10,200^{sq} of laboratories and offices. Close to its main U.S. site, the new premises will be used primarily as compound management laboratory for weighing, solubilizing and formulating several hundreds of thousands of compounds per year. Cerep will

also duplicate on this site some pharmacological assays that are currently run exclusively in Poitiers, France. These services will then be performed both in the U.S. and in France, thus decreasing the time and cost of compound shipment from one continent to another. Another part of these new laboratories will be used to expand ADME1 profiling activities cur-

rently run in Redmond. This activity experienced a fast growth in 2007 and is expected to increase also in 2008 and beyond, making it necessary to extend laboratory space. Expansion and related investments will be kept in the budgeted amount in line with the targeted profitability of Cerep's U.S. subsidiary.

www.cerep.com

Research Lab to Produce Ethanol, Other Biofuels

A former agricultural engineering, power and machinery lab at Cornell is being gutted to make way for a state-of-the-art Biofuels Research Lab that will convert perennial grasses and woody biomass into ethanol and other biofuels and will occupy the entire east wing of Riley Robb Hall by January 2009. The \$6 million lab is being constructed thanks to a \$10 million grant awarded to

Larry Walker, Cornell professor of biological and environmental engineering, from the Empire State Development Corp., and will include analytical equipment, incubators, fermenters and other state-of-the-art biotechnology equipment. The department plans to offer a master's of engineering program focused on biofuels in fall 2008 because demand for trained biofuel engi-

neers is skyrocketing, said Walters. The department has also just hired Largas Agent from Washington University as an associate professor of engineering. His research focuses on biogas and fuel cells.

www.cornell.edu

Reach Expert Network Starts Work

PRODUCT Due to the passage of the new European Chemicals legislation Reach through parliament on Dec. 18, 2006, the following companies are offering their services to the industry within their Reach it network. ATC: Toxicological expertise, Chemical Safety Reports. E-

Samples: Web-based solutions for samples handling in the chemical industry. Laus: GLP test facility covering all possible Reach requirements. Reach Chemadvice: Only Representative required by Reach for non-EU manufacturers. SP-Chemicals: Sourcing solutions, search

for new suppliers or alternative products. It is their goal to assist companies affected by the new legislation, with the implementation of the regulations in accordance with its respective role in the supply chain.

www.reachit.de

Chemical Industry Trends

Data Positive for 2007, Uncertainty in 2008

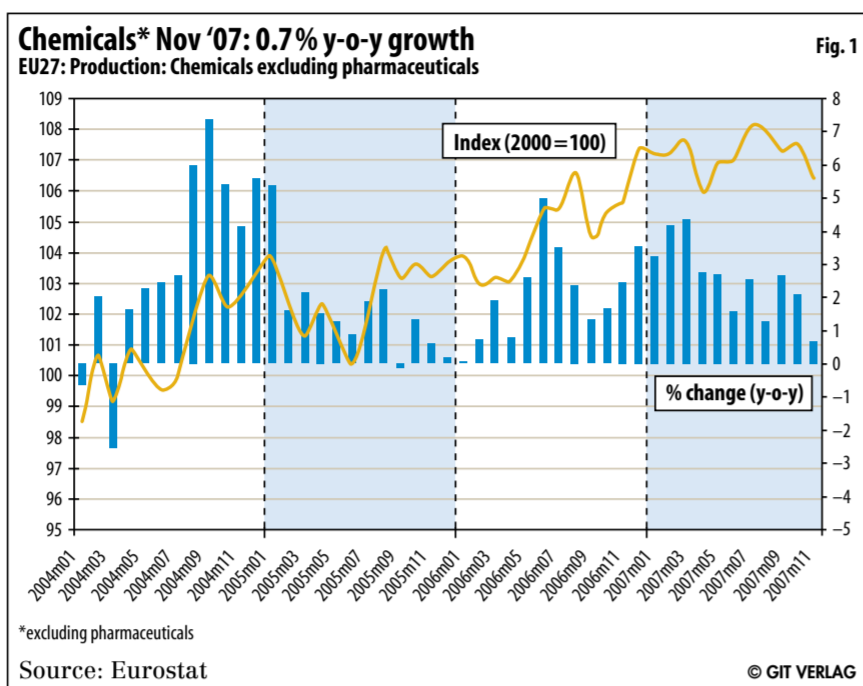
Current Situation — Although business confidence in the chemical industry is low, managers seem to be expecting things to improve in 2008. The global perception of the economic situation in the EU has worsened considerably, and remains only slightly above its long-term average. The same holds for the world economic climate. Worldwide expectations for the coming months are rather negative and reflect the high uncertainty for businesses.

From January to November 2007 European chemical production (excluding pharmaceuticals) grew by 2.5% compared to the same period 2006. This excellent result is however mainly based on the production growth of the last months of 2006. Chemical producer prices (excluding pharmaceuticals) increased by 3% over the period January to November 2007, which indicates much slower growth than in 2006. For the moment, it seems that the oil price reached its peak at the end of 2007. Comparing January to November 2007 to the same period of the previous year, chemical sales (excluding pharmaceuticals) grew by a considerable 5.5%. Exports could not keep up with import growth in 2007, and a shrinking trade surplus can be observed in 2007.

Chemical Production Growth Influenced by 2006 Performance

Data for 2007 are now almost complete, with only Decem-

Exports could not keep up with import growth in 2007 and therefore a shrinking trade surplus in 2007 comes as no surprise.



ber missing. From January to November 2007, European chemical production (excluding pharmaceuticals) grew by 2.5% compared to the same period 2006, but a lot of the growth was actually a growth overhang from the year 2006. In 2007, the growth curve of chemicals excluding pharmaceuticals was relatively flat. Among the subsectors, consumer chemicals remained the growth star of the year (4.8%), followed by petrochemicals (4.1%) and pharmaceuticals (3.8%). Polymers, specialties and basic inorganics followed a less steep growth path, but did perform well nevertheless with growth rates of 1.1% to 1.6% over the period of January to November 2007, compared to 2006. Whereas most of the sectors benefited from the development in 2006, basic inorganics have sped up growth in recent months, despite the negative figures in certain subgroups, such as synthetic rubber and man-made fibers. The growth of specialty chemicals has been slowed down by dyes and pigments and crop protection, the latter not managing to benefit from the agriculture and biofuels hype (figs. 1 and 2).

Chemical Producer Prices Growing Clearly Less than in 2006

Although the producer price continued to increase in 2007, the slope is much less steep compared to 2006. Chemical producer prices (excluding pharmaceuticals) increased by 3% over the period January to November 2007. Petrochemicals showed the highest increase (4.1%). Basic inorganic producer prices grew by 3.9% over the same

Managers in the chemical industry are relatively more optimistic regarding their product expectations for the coming months despite the fact that confidence remains below the long-term average.

period, polymers by 3.1%. The producer price increase for consumer chemicals and specialty chemicals was more moderate, with 1.7% and 2.0% respectively whereas pharmaceuticals remained the only main sector with decreasing producer prices, -0.4%. For the moment it seems that the oil price reached its peak at the end of 2007, with an average price of \$92.5 per Brent barrel in November 2007 and only slightly lower prices in December. Petrochemicals, basic inorganics and polymers are suffering most from high feedstock

prices, as they are further up the value chain. The latest Consensus Forecast January 2008 predicts that the oil price will decline only slightly in the short and medium term.

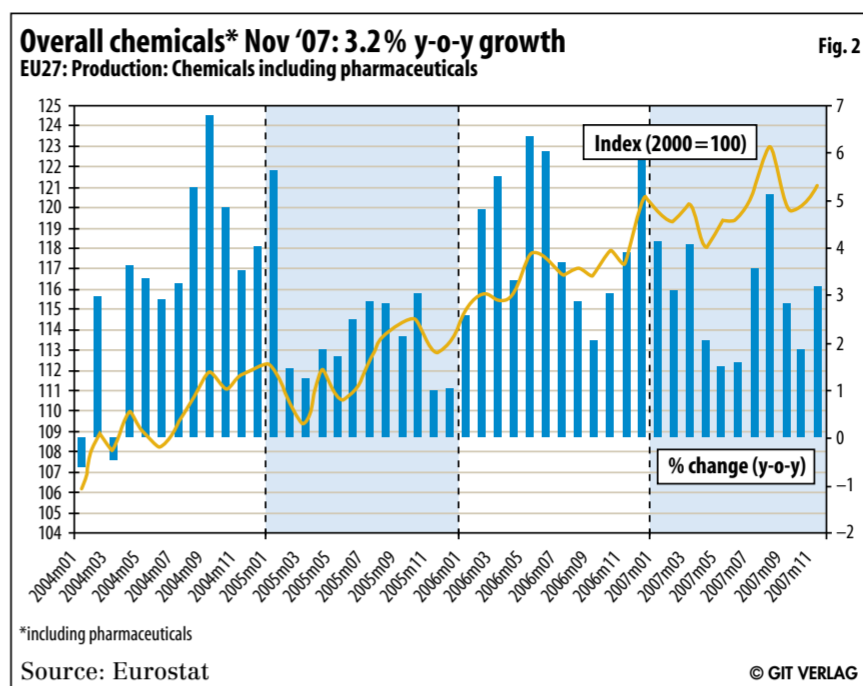
Positive Sales Growth

Comparing January to November 2007 to the same period in 2006, chemical sales (excluding pharmaceuticals) grew by a considerable 5.5%. For

therefore a shrinking trade surplus in 2007 comes as no surprise. Latest available data (October 2007) show that the extra-EU chemical trade balance (excluding pharmaceuticals) shrank by 13% over the first 10 months of 2007 compared to the same period 2006. Extra-EU chemical imports (excluding pharmaceuticals) grew by 13.3%, extra-EU chemical exports by only 4.2%. Petrochemicals were hit

Extra-EU Chemical Trade Surplus in Decline

Exports could not keep up with import growth in 2007 and



most as their trade surplus decreased by almost 50%. Pharmaceuticals registered the best trade performance with a 12% increase in the trade surplus over the first 8 months of the year 2007. Consumer chemicals have also increased their trade surplus. All other subsectors show a negative trend in the trade balance. This trade development is partly a consequence of the Euro/US\$ exchange rate, being at record levels at the end of 2007 and beginning of 2008. These developments are also reflected in the business ex-

pectations of managers in the chemical industry who are worried about the competitiveness of the European chemical industry on the external market. The first quarter of 2008 is however seeing a strong improvement and the perceived competitiveness on the external market is much less negative than in the previous quarters. Likewise, though to a lesser extent, the competitive position is improving on the internal market.

Business Confidence Recovers Better than Total Manufacturing

In January 2008, chemical industry business confidence improved clearly. Managers in the chemical industry are relatively more optimistic regarding their product expectations for the coming months despite the fact that confidence remains below the long-term average. Confidence in manufacturing remains unchanged. Looking at the current situation, there are manufacturing sectors which are more optimistic about their business than the chemical industry. Data indicate a clear satisfaction with current production, but also improving expectations for automotive; food and beverages; machinery and

equipment; and also electrical machinery. There is however skepticism about development in recent months in a majority of subsectors, such as basic metals; rubber and plastics; and pulp and paper. Nevertheless, a certain optimism for the coming months prevails in these sectors. Textiles is the only sector to experience a negative production trend and which does not see the situation changing in the months ahead.

Sentiment Towards European Economy Gloomy

In January 2008, the global perception of the economic situation in the EU worsened considerably, but the Economic Sentiment Indicator still remains slightly above its long-term average. The indicator has been on a downward path since mid-2007 and the decrease is reflected in all major subsectors with the exception of industry which remains constant. Services are clearly the most negative, with a steep decline in confidence and being also clearly below the long-term average.

The Cefic Ifo World Economic Climate index, which is based on the assessments of economic experts around the world, gives a perspective on the global economic climate. Latest data available refer to the last quarter of 2007. The index worsens clearly in the last quarter of 2007, in all major world regions, especially in the U.S. Asia shows the smallest deterioration. Expectations especially are deteriorating, but also the current situation is assessed more negatively than one quarter ago. However, at least the overall assessment indicates no further deterioration.

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Increasingly Challenging

Carbogen Amcis Expects Continued Growth, Announces Investments, Acquisitions

Continued Page 1

that they are performed in the most time- and cost-efficient manner. We now operate four sites, three in Switzerland and one in Manchester, with a total of 80 GMP and non-GMP process reactors of varying scales.

What do you see as the major growth drivers for Carbogen Amcis at the time being and in the foreseeable future?

M. Griffiths: In 2008, in addition to continued organic growth, we expect to grow through acquisitions. Some of the variants we are examining are related to our high-potency business, which currently represents in excess of 20% of our turnover. It is growing significantly and there are opportunities to add additional value. We are still fundamentally basing our offer on technological capability and not capacity. In this respect, I don't see us adding much more in terms of reactor capacity. Instead, I see us leveraging that capacity by applying technology.

We have advanced internal research programs for micro-reactors and supercritical fluids. Last year, we introduced a crystallography group working with our R&D people to introduce understanding and knowledge in polymorphic properties at the earliest possible stage in

process development and to leverage this capability to optimize processes.

Where else would you be looking to do acquisitions besides in the high-potency area?

M. Griffiths: That would be technology-based acquisitions in synergistic areas that enhance

Outside of high potency, the world doesn't need another reactor.

the company's existing technology platform. Outside of high potency, the world doesn't need another reactor, so the acquisition of additional capacity would not be a primary target. If it came with technology and capability, yes, we would be looking at it, but we wouldn't just be looking for capacity, because we don't see that long-term that would create a sustainable position.

What do you consider to be the most valuable part of your business?

M. Griffiths: Undoubtedly, the biggest asset we have is our employees. The dedicated,



Carbogen Amcis is headquartered in Bubendorf, Switzerland. The Bubendorf facility was opened in 1987 and has seen a number of additions over its 20-year history. The manufacturing building was commissioned in 1996 and the lab, administration and containment facilities were opened in 2005. The site now holds 130 staff that focuses on process optimization and manufacture of late phase and commercial API supply.

hardworking, highly qualified people in our company are one of the best groups I have ever had the pleasure of working with. It doesn't matter how good the assets are if you haven't got good people.

And in terms of technologies?

M. Griffiths: We deploy a range of tools and technologies to solve problems with chemical development. And in doing that we have to do that quickly, reli-

ably, we have to have an absolute passion for communication with our customers, complete transparency with our customers on a project or a project basis, to help them make decisions on what to do with their

projects. Paradoxically, a lot of what we do is help customers kill projects, which saves time for them, allows them to focus on the ones that are going through. And we have to do that in a timely manner. So, wrap all of those things up and essentially what we are talking about is a high-added-value offer.

In this industry, a company is only as good as its last project.

Did you do any investments in either capacity expansions or modernization recently at the four facilities, or are you planning to do so?

M. Griffiths: Yes. At the moment we have round about CHF15 million in capital investment running. We have plans to invest a further CHF10 million next year in organic capability, and that is split through pretty much 50/50 between technology and capability. We are looking at things like larger-scale chromatography, for example. We are looking at the addition of a 20 l high-potency lab in Switzerland. That fills a gap in

capability that has become evident to us.

We also want to make our infrastructure a more robust and will continue to invest in analytical capability. Current industry trends indicate a desire to have more data in the early stages of development in order to shorten the drug development timeline altogether.

Also, as I mentioned earlier, good people are essential. We now operate a ratio of two organic chemists to one analytical chemist. That ratio five years ago was three to one.

Do you expect Carbogen Amcis' positive development to continue?

M. Griffiths: Yes, I do, but I think it is going to be increasingly challenging and calls for increased innovation on our part. We always strive to improve our relationships with our customers, and above all, it is essential that we deliver every time. In this industry, a company is only as good as its last project.

www.carbogen-amcis.com

chemanager@gitverlag.com

The Eyes Have It

Global Color Cosmetics Industry Enjoys Steady Growth

Magic's In The Makeup — Along with fragrances, color cosmetics are the most fashion-led category within the beauty market, influencing palette choice and demand for certain types of make-up over others. But increasingly manufacturers are exploring new ways to compete, applying trends from other categories to color cosmetics.



ALL THE COLORS OF THE RAINBOW — Color cosmetics is one of the beauty market's most innovative categories, and new product development is helping to lift unit prices and encourage limited volume growth as well.

(Photo by TwistedHalo/flickr)

While the fast-growing emerging markets are the key source of dynamism within the global category, this approach is helping to encourage modest growth in the more developed markets. The \$35.7 billion color-cosmetics category lagged behind the beauty market average in value sales gains between 2001 and 2006. Over the 2006-2011 forecast period, however, the outlook is more optimistic with a predicted annual growth rate of around 3%. Eye make-up (\$9.4 billion) will see the strongest increases in percentage terms (almost 4% a year), narrowing the gap on the largest color cosmetics sector, facial make-up (\$13 billion). Dramatic, smoky eyes and nude lips, the mod-look dominating make-up trends across Western markets, continue to propel the category, and mascara is an important focus for innovation within the wider category.

The emerging markets are the seats of growth in the global color cosmetics category. Eastern Europe and Latin America together accounted for over a quarter of the \$6.1 billion in absolute growth achieved by the global category over 2001-2006, and going forward the Asian-Pacific markets of China and India are set to become important sources of growth. China's color cosmetics market will expand by almost \$600 million over 2006-2011 according to Euromonitor International forecasts and India's will be the most dynamic in percentage terms.

Yet even the more mature markets are not thought to have reached saturation point; Western Europe alone will see value sales increases of around 2% a year to 2011. Color cosmetics is one of the beauty market's most innovative categories, and new product development is helping to lift unit prices and encourage limited volume growth as well.

Natural Beauty

Natural ingredients, which are central in driving up value in other beauty categories such as skin care and bath/shower products, have found their way into color cosmetics and are offering women a range of added benefits aside from chemical-free formulations. Mineral make-up delivers important nutrients to the skin, provides a natural sunscreen, long-lasting coverage, and is suitable

for sensitive skin types. Bare Escentuals, a pioneer in mineral make-up, saw sales reach almost \$400 million in 2006, although its market niche is increasingly being penetrated by the big-name brands. Maybelline, L'Oréal Paris, Revlon and Almay are just some of the mainstream labels that have launched mineral make-up lines while private label presence is growing, too.

Attracting New Users

Reaching out to new consumer groups is becoming another priority for many cosmetics companies. One of the most recent areas for innovation is within the ethnic niche. In the U.S., the largest market for color cosmetics, Hispanics, African-Americans and Asians account for around a third of the population, and their numbers are growing at more than twice the rate of the population as a whole. It is, therefore, no surprise that they are becoming a target for new color cosmetics launches.

Men have become a more unlikely target. In January 2007, three years after Jean Paul Gaultier made the first steps into men's make-up, Swedish clothing chain H&M launched a mascara for men. There is also an array of niche brands including KenMen. While it is unlikely that the men's segment will find widespread appeal, segmentation by age holds more promise. Bratz mascara and the marykateandashley make-up line are just two examples of brands trying to capture some of the estimated \$250 million teen consumers spend globally on consumer products each year. With an estimated buying power of \$2.1 trillion in the U.S. alone, the baby-boomer generation is an even more tempting draw for cosmetics brands. However, the dramatic failure of Revlon's Vital Radiance, aimed at the 50+ woman, suggests that this consumer segment can be a difficult market to tap into.

Delivery Innovation

Faster or improved application is a growing priority for women and is

the main thrust behind the extensive innovation in mascara brushes in recent years. More recently it has filtered into the nail products sector, with the launch of improved brushes to make applying nail polish faster and more accurate. Sampling and single-use packs are also a growing trend in color cosmetics, providing convenience, portability and a low-cost way to experiment with new color combinations. Canadian make-up firm Cargo leads the way in this trend, offering products such as single-use eye shadow ColorCards and DailyGloss lip colors packaged in individual tear-away pouches.

Niche Brands Expand Their Presence

With innovation so central to color cosmetics, the category is increasingly being penetrated by niche brands offering eye-catching new approaches to tempt consumers away from the big-name brands. Kiss My Face (which offers natural cosmetics), Duwop (with functional products including lip plumping Lip Venom), Taxi (with its portable cosmetics range) and ModelCo (a make-up artist brand) are just some of the labels that are pouring into the market. Their prominence within the category is also being helped by the growing willingness of retailers to stock niche brands as a way to differentiate their product ranges and cater for growing consumer sophistication. The leading brands are expected to ramp up their efforts to cater for niche demands going forward as a way of surviving in an increasingly competitive category.

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Nutricosmetics Market Set to Bloom

Beauty in a Pill — Foundations and moisturizers are no longer enough as women increasingly turn to more complex cosmetic solutions to satisfy their desire to look younger – and no, surgery is not involved.

Euromonitor International's new strategy briefing on beauty drugs discusses the market and consumer trends driving the evolving beauty market along with consumers' perceptions of new beauty-enhancing products.

Now more than ever women are placing more emphasis on beauty and the desire to stay young – or at least the appearance of youth. The demand for anti-ageing products has set the course for a newly dynamic beauty market. Adding supplements to foods and cosmetics is generating interest by both consumers and manufacturers in developed and emerging markets. Vitamins and supplements are also tapping into the cosmetics world through the introduction of nutricosmetics – supplements with beauty-enhancing benefits, generally focused at anti-ageing.



HOW YOUNG CAN YOU GO More and more women are turning to anti-ageing products, such as cosmetics and dietary supplements, to fight the hands of time.

(Photo by Hindemitt/Photocase)

Euromonitor said it expects beauty drugs to blossom in the near future, and identifies emerging markets such as Brazil and China as core markets for growth. Euromonitor also addresses the confusion most consumers face

with these more complex products. Although the terms cosmeceuticals, nutraceuticals and nutricosmetics help to compartmentalize the various products with beauty-enhancing characteristics, a clear division between categories is not always apparent.

"The level of complexity of beauty-enhancing products has made it difficult for consumers to differentiate between their various functions, thus making a clear definition for the category essential for growth," said Senior Industry Analyst Diana Dodson. "Consumers also demand convenience and simplicity from their beauty regimes and this is something manufacturers of beauty drugs can really exploit."

Nonetheless, the concept of beauty and youth are highly dominant motivators for most consumers, and have continually fostered the demand for beauty-enhancing products.

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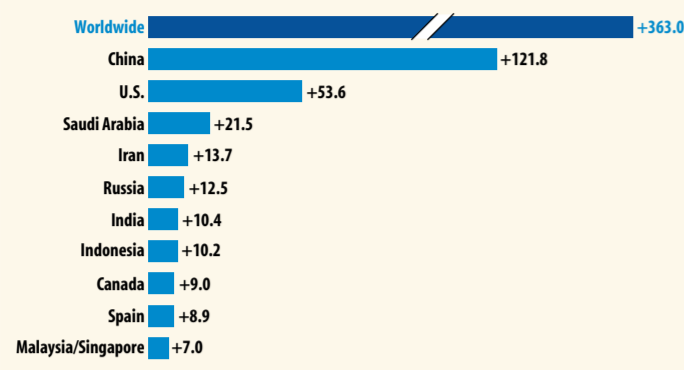
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Oil: Growth is Running Smoothly

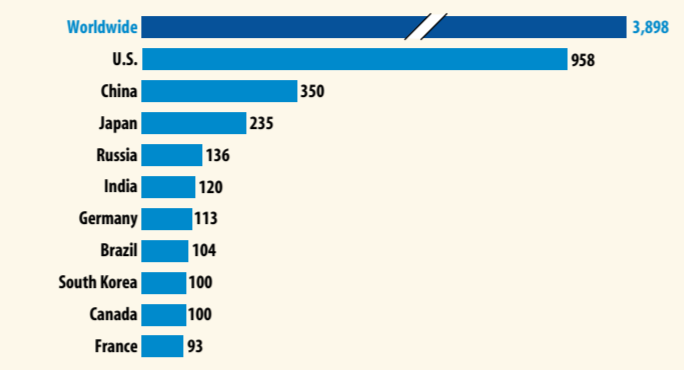
Crude oil: Emerging markets very thirsty
Countries with the highest increase of mineral oil consumption from 2000 to 2006 (in million t)



Source: Cologne Institute for Economic Research

The price of oil has been steadily increasing over the last several years. Even if the whole global economy were affected by the U.S. credit crisis, it would only signify a momentary breather for the price of oil.

The greatest consumers of oil 2006 (in million t)

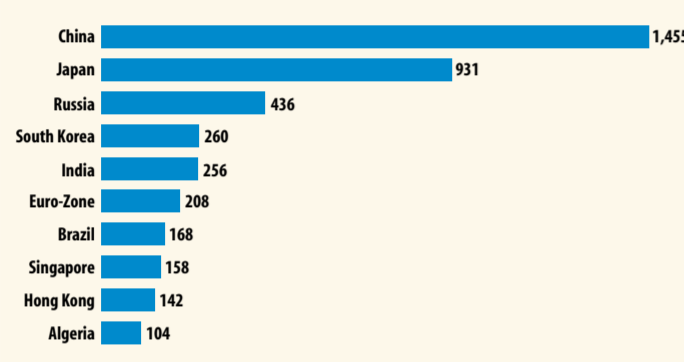


Source: Cologne Institute for Economic Research

Russia and Brazil have not yet reached the American levels of oil consumption, but they grow more dynamically than industrialized countries.

Global Economy: Danger Currency Reserves

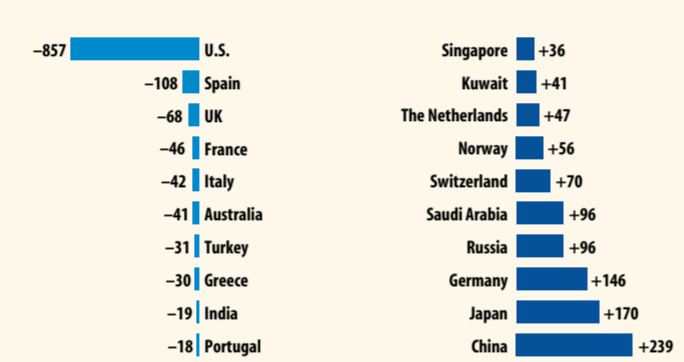
World currency reserves: Asia hoarding
Countries with the biggest currency reserves (Billion US-\$)



Source: Cologne Institute for Economic Research

There's a rumbling in the international financial world - and not only because of the current crisis mood on the stock market. The threat is coming from another direction: Emerging markets like China have been stockpiling currency reserves in dollars.

Capital provider Asia
The biggest capital acquirer (-) and capital provider (+) in 2007 (netto in Billion US-\$)

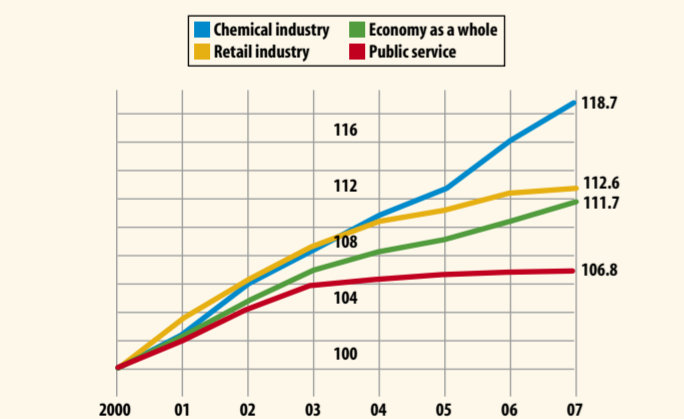


Source: Cologne Institute for Economic Research

fact, it may be considered advantageous for the global economy that many nations have committed themselves to the currency of America; however, because of this, the fate of American dollar is hanging by a thread.

High Spirits do Rarely Good

Standard wages: Chemical industry is growing
Hourly wages and salaries, 2000=100

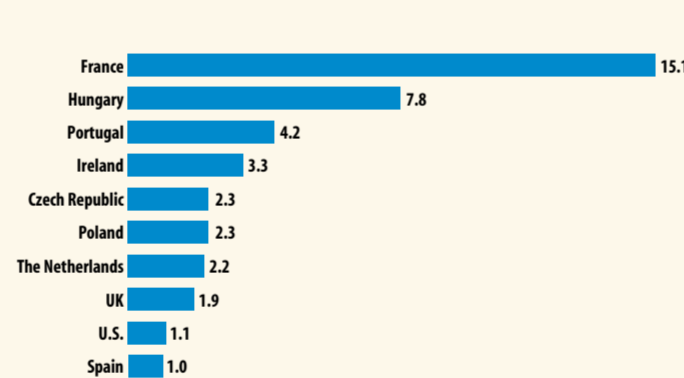


Source: Cologne Institute for Economic Research

In spite of the warning voices concerning 2008, the euphoria about the unusual economic growth last year has not yet ebbed away. Proportionately high are the first wage demands of the labour unions.

The Minimum Wage: Adverse Effects

The minimum wages: Mostly symbolic in many countries
Full-time-employees with minimum wages in % of all full-time-employees



Source: Cologne Institute for Economic Research

A look at France should discourage the supporters of the minimum wage. There are a lot of employees - particularly the young - who cannot get jobs because the price of their labor is too expensive.

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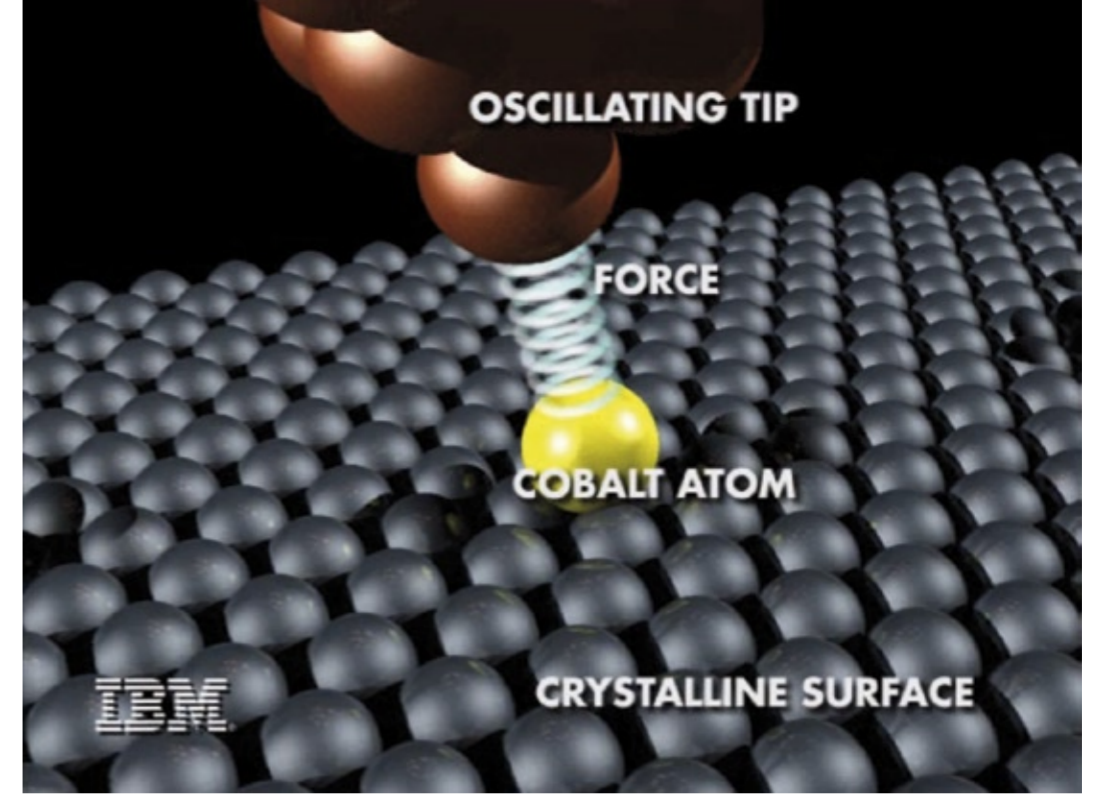
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Measurements To Improve Nanotechnology



Researchers at IBM and the University of Regensburg in Germany have discovered how to measure the force needed to move individual atoms on a surface.

devices. The ability to control atoms and move them around on a surface was first discovered by an IBM researcher in 1989. However, the exact force needed to move specific atoms, which is critical to the construction of microscopic structures, was previously unknown.

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